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# CAMBEX
## STANDALONE UTILITIES
## VERSION 4.3

USER'S GUIDE

CAMBEX CORPORATION
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STANDALONE UTILITIES USER'S GUIDE
VERSION 4.3

# CAMBEX STANDALONE UTILITIES

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USER'S GUIDE

# PREFACE

This document describes the following Cambex Standalone Utilities:

- The Disk/Diskette to Disk/Diskette (CK) utility enables copying the contents of a user-specified disk or diskette storage area. This utility replaces previous DK, KD, DD, CC, and KK utilities.

- The Disk/Diskette to Printer Dump (DP) utility enables dumping the contents of a user-specified disk or diskette storage area to a selected printer device.

- The Patch Disk/Diskette (PD) utility enables altering the contents of user-specified areas of disk or diskette storage by applying patches to those areas.

- The SMD and MMD Disk Initialization (DI) utility performs disk initialization for the Storage Module Drive (SMD) or for the Mini Module Drive (MMD) disk units.

- The CMD Disk Initialization (CI) utility performs disk initialization for the Cartridge Module Drive (CMD) disk units.

- The RDD Fixed Disk Initialization (WI) utility performs disk initialization for the WREN II disk drive.

- The EMD Disk Initialization (EI) utility performs disk initialization for the Cambex Eight inch Module Drive (EMD) disk unit(s).

- The Diskette Initialization (KI) utility performs diskette initialization for IBM 4964, 4965, or 4966 Diskette Units and the Certainty Series flexible disk drives.

- The Identify Devices (ID) utility lists device names and device addresses of all peripheral equipment included in the Series/1 system.

- The Disk/Tape to Tape/Disk (TP) utility performs several copy/restore utility functions supporting the Dual and Single Cartridge Tape Streamer subsystem.

This publication describes how to use these utilities on an IBM Series/1 computer system. Most of the utilities described in this document have a counterpart in the IBM Standalone Utilities. The disk-oriented IBM counterpart utilities, however, do not function properly with all IBM and Cambex peripheral equipment. The Cambex utilities, on the other hand, function with all IBM and Cambex disk and diskette units.

The information in this publication is for Series/1 system users and operators, who should be familiar with Series/1 computer systems and with their operation.

Information for using the SMD, MMD, CMD, WREN, EMD, and the cartridge tape streamer subsystem(s) is in the following publications:

| Title | Publication Number |
|---|---|
| Cambex 80270-10, 80271-10, and 80270-30 Storage Module Drives Reference Manual | 62947900 |
| Cambex 80210 Flexible Disk Drive and 80230/80231/80240/80241 Mini Module Drive Reference Manual | 62947908 |
| Cambex 80280-10 and 80280-20 Cartridge Module Drive Reference Manual | 60465780 |
| Cambex CMD System Considerations User's Guide | 60465930 |
| Cambex Model 80810-10 Cartridge Tape Streamer Subsystem Reference Manual | 60467470 |
| Cambex Model 80220-10 Disk Storage Subsystem Reference Manual | 60467410 |
| Cambex Model 80820-10 Cartridge Tape Streamer Hardware Maintenance Manual | 930-054-461 |

Copies of these publications or additional copies of this publication may be ordered from:

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DISCLAIMER

This product is intended for use only as described in this publication. Cambex cannot be responsible for the improper functioning of undescribed features or undefined parameters.

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APPENDIXES



TABLES

This section describes the purpose, function, and features of the Cambex Standalone Utilities. The section then specifies the minimum Series/1 system configuration for using the utilities and the devices supported by the utilities.

The Cambex Standalone Utilities (Version 4.3) are provided on a Cambex supplied 8 inch diskette, part number 063-406-001 or 5.25 inch diskette, part number 063-502-001.

## PURPOSE

The Cambex Standalone Utilities (SAUs) provide utility functions on a Series/1 system with Certainty Series Storage Module Drives (SMDs), Mini Module Drives (MMDs), Cartridge Module Drives (CMDs), RDD Fixed Disk (WREN), or Eight inch Module Drives (EMDs). Cambex offers a variety of SMD, MMD, CMD, WREN, and EMD disk units for attachment to a Series/1 computer system. The SMD and CMD feature removable storage media. The disk units are referred to as follows:

| Product | Term Used |
|---|---|
| 80230/80240-10 | 9.3-MB MMD |
| 80230/80240-15 | 13.9-MB MMD |
| 80230/80240-30 | 63.2-MB MMD |
| 80230/80240-30G | 64.2-MB MMD |
| 80231/80241-60 | 126.6-MB MMD |
| 80270-10 | 63.2-MB SMD |
| 80271-10 | 126.4-MB SMD* |
| 80270-30 | 240.2-MB SMD |
| 80280-10 | 77.8-MB CMD** |
| 80280-20 | 77.8-MB CMD** |
| 80810-10 | 60.0-MB Tape Drive |
| 80820-10 | 250.0-MB Tape Drive |
| 80220-10 | 64.5-MB WREN |
| 80250-10 | 200-MB EMD |
| 80250-15 | 276.5-MB EMD |
| 80250-20 | 512-MB EMD |

For Series/1 purposes, the Cambex SMD and MMD units appear as large IBM 4962 disk units. Since the SMD and MMD have more cylinders and tracks than the 4962 disk units, they are able to provide more storage capability. The CMD fixed module and the rigid disk drive (RDD) both appear to have the same number of cylinders, tracks, and sectors as the IBM 4963 Model 64 disk storage unit.

* The 126.4-MB SMD actually contains two separately addressable 63.2-MB units.

** The 77.8-MB CMD actually contains two separately addressable units: a 64.5-MB fixed module and a 13.3-MB removable cartridge.

The CMD removable cartridge is implemented to appear to have the same number of tracks and sectors as the IBM 4963 Model 64 disk storage unit, but to have fewer cylinders. The 200 MB EMD has the same number of Relative Blocks as the IBM 4967-2CA disk storage unit. For Series/1 purposes the 276.5 MB EMD appears as a 4967-3CA, but with fewer Relative Blocks and the 512 MB EMD appears as a 4967-3CA, but with more Relative Blocks. Table 1-1 summarizes the pertinent storage characteristics of the IBM and Cambex disk units.

TABLE 1-1. IBM AND CAMBEX DISK UNIT STORAGE

| Unit | Cylinders | | Heads | | Sectors | |
|---|---|---|---|---|---|---|
| | First | Last | First | Last | First | Last |
| IBM 4962 | 000 | 302 | 0 | 1 or 2 | 00 | 59 |
| IBM 4963 | 000 | 358 | * | * | 00 | 63 |
| 80230/240-10 MMD | 000 | 302 | 0 | 1 | 00 | 59 |
| 80230/240-15 MMD | 000 | 302 | 0 | 2 | 00 | 59 |
| 80230/240-30 MMD | 000 | 822 | 0 | 4 | 00 | 59 |
| 80230/240-30G MMD | 000 | 822 | 0 | 4 | 00 | 59 |
| 80231/80241-60 MMD | 000 | 432 | 0 | 11 | 00 | 59 |
| 80270/271-10 SMD | 000 | 822 | 0 | 4 | 00 | 59 |
| 80270-30 SMD | 000 | 822 | 0 | 18 | 00 | 59 |
| 80280-10 or 20 CMD Fixed Module | 000 | 373 | 0 | 10 | 00 | 63 |
| 80280-10 or 20 CMD Removable Cartridge | 000 | 073 | 0 | 10 | 00 | 63 |
| 80220 RDD Disk | 000 | 358 | 0 | 10 | 00 | 63 |

* Number of heads depend on the model.

| UNIT | FIRST RBA | LAST RBA |
|---|---|---|
| IBM DDSK30 | 0 | 120495 |
| IBM DDSK60 | 0 | 240991 |
| IBM IDISK/EDISK | 0 | 158843 |
| IBM IDISKETTE/EDISKETTE | 0 | Format Dependent |
| IBM 4967-2CA | 0 | 782039 |
| IBM 4967-3CA | 0 | 1402183 |
| 200 MB EMD | 0 | 782039 |
| 276.5 MB EMD | 0 | 1080459 |
| 512 MB EMD | 0 | 2094614 |

## FUNCTION

The Cambex Standalone Utilities enables full utility-program capabilities for Series/1 system users that elect to attach SMD, MMD, CMD, WREN, and EMD disk units to their system as additional storage area disk units or as a system disk unit. The utility programs are as follows:

- Disk/Diskette to Disk/Diskette (CK)
- Disk/Diskette to Printer Dump (DP)
- Patch Disk/Diskette (PD)
- SMD and MMD Disk Initialization (DI)
- CMD Disk Initialization (CI)
- RDD Fixed Disk Initialization (WI)
- EMD Disk Initialization (EI)
- Diskette Initialization (KI)
- Identify Devices (ID)
- Disk/Tape Utility (TP)

## MINIMUM SYSTEM REQUIREMENTS

The Cambex Standalone Utilities do not require any special software support to run.

Using the Cambex Standalone Utilities requires a Series/1 system with the following minimum hardware configuration:

- A Series/1 processor with a minimum of 64KB of memory
- An operator station; the Cambex Standalone Utilities will select the terminal by searching for the following terminals in the following order:

1.

| Terminal (In Order) | Device Address (Hexadecimal) |
|---|---|
| IBM 4979 or 80610 Viking | 04 |
| IBM 4978 * | 04 |
| IBM 4978 * | 24 |
| TTY | 00 |
| IBM 3101 Terminal on | |
| IBM feature 1610 ** | 08 |
| 2091/2092 ** | 60 |
| 2095/2096 ** | 68 |
| RPQ2350 *** | 68 |
| 1310 *** | 58 |

2. The 4979, Viking, 4978, or TTY on the lowest device address

3. The 3101 on feature 1610 **, feature 2091/2092 **, feature 2095/2096 **, or feature 1310 *** on the lowest device address

- Some utilities require diskette, disk, printer, or cartridge tape streamer units. These may be on any device address.

The attachment of additional devices to the system is optional. You may attach additional devices at any of the available device addresses. The Cambex ID utility lists all devices.

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* Cycle-steal status is used to determine the on-line status. If the unit is on-line, the Cambex modification program uses the character set currently defined in the RAM. If the unit is off-line, the RAM is loaded with the Model 1 4978 RAM code for the RPQ D02056 keyboard. If another model character set is desired, the user is responsible for ensuring that it is loaded into the RAM so that the unit is on-line.

** Attachment feature assumes 1200 bits per second, range high, and IBM 3101 Models 20, 22, or 23 in block mode. The setup switches under the panel on the 3101 keyboard should be set as follows:

Group 1 x 'B2'
Group 2 x '10'
Group 3 x 'F0'
Group 4 x '55'

(The 3101 in block mode uses the SEND key instead of the ENTER key.)

*** Attachment feature assumes 9600 bits per second, RS422 mode, IBM 3101 Model 23, and port 1 (base address +1) for the 1310. The setup switches under the panel on the 3101 keyboard must be set as follows:

Group 1 x '92'
Group 2 x '10'
Group 3 x 'F0'
Group 4 x '99'

(The 3101 in block mode uses the SEND key instead of the ENTER key.)

The loader IPL-loads the RAM for the multifunction card.

DEVICES SUPPORTED BY THE UTILITIES

The Cambex Standalone Utilities currently support the peripheral devices listed in table 1-2 when the devices are attached to a Series/1 computer system.

TABLE 1-2. DEVICES SUPPORTED BY CAMBEX STANDALONE UTILITIES

| Product | Description | Utility | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CI | CK | DP | PD | DI | KI | ID | TP | EI | WI |
| IBM 4964 | Diskette Unit | | X | X | X | | X | X | | | |
| IBM 4966 | Diskette magazine | | X* | X | X | | X | X | | | |
| IBM 4962-1,2,3,4 | 4962 without fixed heads | | X | X | X | | | X | X | | |
| IBM 4962-1F,2F | 4962 with fixed heads | | X | X | X | | | X | X | | |
| IBM 4963-23A/B | 4963 with fixed heads | | X | X | X | | | X | X | | |
| IBM 4963-29A/B | 4963 without fixed heads | | X | X | X | | | X | X | | |
| IBM 4963-58A/B | 4963 with fixed heads | | X | X | X | | | X | X | | |
| IBM 4963-64A/B | 4963 without fixed heads | | X | X | X | | | X | X | | |
| IBM 4967-2CA,2CB | 200 MB disk | | X | X | X | | | X | X | | |
| IBM 4967-3CA,3CB | 350 MB disk | | X | X | X | | | X | X | | |
| IBM DDISK-30/60 | D Disk model 30/60 | | X | X | X | | | X | X | | |
| IBM 4965 | Diskette unit | | X | X | X | | X | X | | | |
| IBM 4973 | Printer | | | X | | | | X | | | |
| IBM 4974 | Printer | | | X | | | | X | | | |
| IBM IDISK | 40 MB Disk Drive | | X | X | X | | | X | X | | |
| IBM IDISKETTE | 1.2 MB Disktte Dr. | | X | X | X | | | X | | | |
| 80230/80240-10 | 9.3-MB MMD | | X | X | X | X | | X | X | | |
| 80230/80240-15 | 13.9-MB MMD | | X | X | X | X | | X | X | | |
| 80230/80240-30 | 63.2-MB MMD | | X | X | X | X | | X | X | | |
| 80230/80240-30G | 63.2-MB MMD with fixed head | | X | X | X | X | | X | X | | |
| 80231/80241-60 | 126.6-MB SMD | | X | X | X | X | | X | X | | |
| 80270-10/-20 | 63.2-MB SMD | | X | X | X | X | | X | X | | |
| 80271-10 | 126.4-MB SMD | | X | X | X | X | | X | X | | |
| 80270-30 | 240.2-MB SMD | | X | X | X | X | | X | X | | |
| 80210-10 | FDD diskette unit | | X | X | X | | X | X | | | |
| 80280-10 | CMD primary unit | X | X | X | X | | | X | X | | |
| 80280-20 | The second CMD | X | X | X | X | | | X | X | | |
| 80220-10,11,12 | RDD fixed disk | | X | X | X | | | X | X | | X |
| 80420 | Printer | | | X | | | | X | | | |
| 80450 | Printer | | | X | | | | X | | | |
| 80810-10 | Streamer Tape | | | | | | | X | X | | |
| 80820-10 | Dual Streamer Tape | | | | | | | X | X | | |
| 80250-10 | 200 MB EMD | | X | X | X | | | X | X | X | |
| 80250-15 | 276.5 MB EMD | | X | X | X | | | X | X | X | |
| 80250-20 | 512 MB EMD | | X | X | X | | | X | X | X | |

* Restriction - Only slots 1, 2, and 3 are supported

Section 2 describes how to call and use the Cambex Standalone Utilities (SAUs). The section first provides general usage and error-handling information for the utilities and then describes how to use the utilities in greater detail. This section describes the following Cambex utilities:

- Disk/Diskette to Disk/Diskette (CK)
- Disk/Diskette to Printer Dump (DP)
- Patch Disk/Diskette (PD)
- SMD and MMD Disk Initialization (DI)
- RDD Fixed Disk Initialization (WI)
- EMD Disk Initialization (EI)
- Diskette Initialization (KI)
- Identify Devices (ID)
- Disk/Tape to Tape/Disk (TP)

This section describes the general functions of all the utilities.

Place the IPL SOURCE switch on the CPU basic console in the ALTERNATE* position to enable initial program loading of the diskette loader and to enable calling a Cambex utility from the diskette. After loading the diskette loader, enter the two-letter code name of the desired Cambex utility on the terminal.

* This assumes that ALTERNATE IPL is set on the diskette unit attachment card.

## GENERAL ERROR-HANDLING INFORMATION

The system can detect two types of errors: recoverable and unrecoverable. Recoverable errors are normally due to an invalid response to a parameter request from a utility. Unrecoverable errors are the result of a system fault.

A message on the operator station usually notes recoverable errors. The message states the cause of the error and asks you to re-enter the error-initiating parameter entry. Examples of such errors include the following:

- Requesting a wrong or nonexistent device to perform an operation; for example, entering a hexadecimal address.

- Omitting requested parameters or entering parameters that are too long, too short, improperly formatted, or contain improper information (alpha characters where numerics are necessary or vice versa).

- Entering parameters that are too large or too small for the specified device.

- Specifying a source data file larger than the destination file designated to receive the data during a disk/diskette operation.

- Specifying a starting sector address greater than the ending address for a disk/diskette extents request.

To correct these types of errors, re-enter the requested parameter(s).

Another type of recoverable error produces a message that directs you to perform some type of corrective action (for example, check printer, check disk unit, load paper). For these types of errors, perform the requested action and attempt the desired operation again. If this type of error message continues after corrective action is taken, the error condition is probably unrecoverable. In that case, call for the assistance of the system maintenance personnel.

Unrecoverable errors terminate an operation and cause a program termination error message to appear on the operator station.

## HOW TO USE THE UTILITIES

The following paragraphs describe how to use each of the Cambex Standalone Utilities. Each utility description includes usage procedures.

Remember the following items when using the Cambex Standalone Utilities:

- Nearly all your interaction with the system normally occurs at the terminal. In the following text, assume that all interaction occurs at the terminal unless otherwise stated.

- Specifying a sector address for an IBM 4963 disk, a CMD, or a 240-MB SMD may require a cccttss entry rather than the ccctss entry used for the other available types of disk units because a track may require two decimal digits.

- All entries specifying disk/diskette storage locations or device addresses are in decimal.

- The IBM DDSK30, DDSK60, IDISK(ETTE), 4967's and the Cambex EMD's use Relative Block Addresses (RBA's) to reference disk sectors, all the other IBM and Cambex devices use Cylinder, Track, Sectors (CTS) to reference disk sectors.

- Terminal input requires upper case characters.

## DISK/DISKETTE TO DISK/DISKETTE (CK) UTILITY

Use the Disk/Diskette to Disk/Diskette (CK) utility for copying the contents from a user-specified disk or diskette storage area to another user-specified disk or diskette storage area. The program copies between any combination of the devices supported, and you can make either full or partial copies. Refer to table 1-2 for a list of the supported devices.

### CK Utility Procedure

To load and use the CK utility, perform the following steps:

1. Press the LOAD switch on the console after setting the IPL SOURCE switch on the CPU basic console to the appropriate position.

   The following message appears on the screen:

   ```
   SELECT OPTION ===>
   ```

2. Enter CK and press the carriage return (or ENTER) key. The following message appears on the screen:

   ```
   CAMBEX DISK/DISKETTE COPY
   ENTER FROM DEVICE ADDRESS OR (CTS*/RBA**) FORMAT:
   ```

3. Seven possible directives describe the copy-from and copy-to devices:***

   - Full copy (CTS/RBA device)
   - Full fixed heads copy
   - Partial copy of a CTS device
   - Partial copy of an RBA device
   - Partial fixed heads copy
   - Full magazine copy
   - Partial magazine copy

The CK utility does not copy diskette cylinder 0 when performing a full copy between a disk and a diskette. Diskette cylinder 0 contains control address marks for which no equivalent exists on disk. The system does not use diskette cylinder 0 on many types of diskettes; and therefore, a full copy is adequate. The system does use diskette cylinder 0 for some types of diskettes (for example, IBM BASIC exchange).

The CK copies diskette cylinder 0 when performing a diskette-to-diskette full copy.

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* CTS format = cylinder, track, sector format.

** RBA format = relative block address.

*** The device can be either a disk or a diskette.

a. To copy diskette cylinder 0 when performing a full copy between a disk and a diskette, first perform a separate, partial copy for diskette cylinder 0, obtaining the sectors that are not control address marks.

The possible copy formats are as follows:

| Format | Description |
|---|---|
| a | Full copy (CTS/RBA device) |
| aa | |
| aaa | |
| F,a | Full fixed heads copy |
| F,aa | |
| F,aaa | |
| aaa,ccctss,ccctss | Partial copy of a CTS Device |
| aaa,cccttss,cccttss | |
| R,aaa,bbbbbbb,eeeeeee | Partial copy of an RBA device |
| F,aaa,tss,tss | Partial fixed heads copy |
| F,aaa,ttss,ttss | |
| Mx,a | Full magazine copy |
| Mx,aa | |
| Mx,aaa | |
| Mx,aaa,ccctss,ccctss | Partial magazine copy |
| Mx,aaa,cccttss,cccttss | |

The uppercase characters R, M and F are part of the message format. The R designates an RBA device, the M designates diskette magazine, and the F designates fixed head. The lowercase characters represent the following decimal digits that you must enter on the terminal:

- a = device address
- c = cylinder
- t = track
- s = sector
- x = diskette magazine slot number 1, 2, or 3
- b = beginning RBA (a decimal number from 1 to 7 digits in length)
- e = ending RBA (a decimal number from 1 to 7 digits in length)

b. Enter the correct format for the selected copy-from device. The following message appears on the screen:

ENTER TO DEVICE ADDRESS OR (CTS/RBA) FORMAT:

4. Enter the correct format for the selected copy-to device. The following message appears on the screen:

```
*WAIT* DISK/DISKETTE COPY*PROCESSING*
```

When the copy is finished, the following message appears on the screen:

```
LAST SECTOR (CTS/RBA) WRITTEN:  XXXXXXX
CAMBEX DISK/DISKETTE COPY
ENTER FROM DEVICE ADDRESS OR (CTS/RBA) FORMAT:
```

The last message allows you to make additional copies.

## DISK/DISKETTE TO PRINTER DUMP (DP) UTILITY

The Disk/Diskette to Printer Dump (DP) utility enables you to dump data from any disk or diskette unit in the system to any printer unit in the system. Table 1-2 lists the supported devices.

### DP Utility Procedure

To load and use the DP utility, perform the following steps:

1. Press the LOAD switch on the console after setting the IPL SOURCE switch on the CPU basic console to the appropriate position.

   The following message appears on the screen:

   ```
   SELECT OPTION ===>
   ```

2. Enter DP and press the carriage return (or ENTER) key. The following message appears on the screen:

   ```
   CAMBEX DISK/DISKETTE TO PRINTER UTILITY
   ENTER PRINTER ADDRESS, FORMAT:
   ```

   The three possible directives you can use to describe the printer address and format are as follows:

   ```
   a,E/H
   aa,E/H
   aaa,E/H
   ```

   The character designations are as follows:

   - a = printer address digit (in decimal)
   - E = EBCDIC dump desired
   - H = hexadecimal

   Choose either E or H.

3. Enter the requested information. Press the carriage return (or ENTER) key. The following message appears on the screen:

   ```
   ENTER DEVICE EXTENTS:
   ```

The directives available for use in entering the extents are as follows:

| Format | Description |
|---|---|
| a | Full copy (CTS/RBA device) |
| aa | |
| aaa | |
| F,a | Full fixed heads copy |
| F,aa | |
| F,aaa | |
| aaa,ccctss,ccctss | Partial copy of a CTS Device |
| aaa,cccttss,cccttss | |
| R,aaa,bbbbbbb,eeeeeee | Partial copy of an RBA device |
| F,aaa,tss,tss | Partial fixed heads copy |
| F,aaa,ttss,ttss | |
| Mx,a | Full magazine copy |
| Mx,aa | |
| Mx,aaa | |
| Mx,aaa,ccctss,ccctss | Partial magazine copy |
| Mx,aaa,cccttss,cccttss | |

The uppercase characters R, M and F are part of the message format. The R designates an RBA device, the M designates a diskette magazine, and the F designates fixed heads. The lowercase characters represent the following decimal digits that you must enter on the terminal:

- a = device address
- c = cylinder
- t = track
- s = sector
- b = beginning RBA (a decimal number from 1 to 7 digits in length)
- e = ending RBA (a decimal number from 1 to 7 digits in length)
- x = diskette magazine slot number 1, 2, or 3

4. Enter the parameters (in the correct format) for the area on the disk or diskette to be dumped. When printing is completed, the following message appears again on the screen:

   'ENTER DEVICE EXTENTS'

This enables you to make additional disk-to-printer dumps to the same printer device from either the same disk unit or a different disk unit.

5. Initial program load (IPL) to reset the system and to enable calling the utility for the next desired operation if you want a different utility or a disk dump to a different printer.

## PATCH DISK/DISKETTE (PD) UTILITY

The Patch Disk/Diskette (PD) utility enables you to apply patches to user-specified areas of disk/diskette storage. These patches are done in hexadecimal format. The patches can contain up to 244 contiguous hexadecimal characters (122 bytes). Table 1-2 lists the devices that the PD program supports.

Both single-sided and double-sided diskettes are supported at single and double density. The utility supports diskette sector sizes of 128 bytes, 256 bytes, 512 bytes, and 1024 bytes.

### PD Utility Procedure

To load and use the PD utility, perform the following steps:

1. Press the load switch on the console after setting the IPL SOURCE switch on the CPU basic console to the appropriate position.

   The following message appears on the screen:

   ```
   SELECT OPTION ===>
   ```

2. Enter PD and press the carriage return (or ENTER) key. The following message appears on the screen:

   ```
   CAMBEX PATCH UTILITY
   ENTER ADDRESS,SECTOR (CTS/RBA FORMAT):
   ```

   The five possible directives that you can use to describe the device where the patching will take place are as follows:

   ```
   aaa,ccctss
   aaa,cccttss
   R,aaa,bbbbbbb
   F,aaa,tss
   F,aaa,ttss
   ```

   The uppercase characters R and F are part of the message format. The R designates an RBA device, and the F designates fixed heads.

   The lowercase characters represent the following decimal digits you must enter on the terminal:

   - aaa = device address
   - ccc = cylinder number
   - t or tt = track number
   - ss = sector number
   - b = RBA of sector (a decimal number from 1 to 7 digits in length)
   - F = to specify fixed heads

3. Enter the correct format for the selected device. Press the carriage return (or ENTER) key. The following message appears on the screen:

```
ENTER CMD*(D/R),SECTOR OFFSET,COUNT  :
```

The two possible directives are as follows:

```
D,bbb,ccc (Display data on the operator's console)
R,bbb,ccc XXXX XXXX (Patch data on disk or diskette)
```

Where:

- D = Display data on operator console
- R = Replace XXXX (hexadecimal) data
- bbb = Sector offset (the decimal number identifying where within the sector the patch is to start)
- ccc = Byte count (number of bytes, in decimal, to be displayed or patched)

4. Enter the parameters for the chosen directive. Press the carriage return (or ENTER) key. The previous message reappears on the screen:

```
ENTER CMD (D/R),SECTOR OFFSET,COUNT:
```

This message indicates that additional data can be displayed or patched within the same sector.

5. Press the carriage return (or ENTER) key in response to the following query when all patches to the same sector are completed:

```
ENTER CMD(D/R),SECTOR OFFSET,COUNT:
```

The following message appears on the screen:

```
SECTOR UPDATED
ENTER ADDRESS,SECTOR(CTS/RBA FORMAT)
```

6. a. Repeat the procedure from step 3 if you are going to patch another sector.

   b. IPL to reset the system and to enable calling a different utility if you are not patching another sector.

---

* Within messages, CMD signifies command.

## SMD AND MMD DISK INITIALIZATION (DI) UTILITY

The Cambex SMD and MMD Disk Initialization (DI) utility performs a number of useful functions. Its primary use is initializing disk storage by formatting it into sectors. In performing this function, the DI utility formats disks in the same manner as IBM for the IBM 4962 disk. The utility formats disks into 60 sectors per track, each of which has a data field 256 bytes in length.

Besides its primary function of initializing disk storage areas, the DI utility also has the following capabilities:

- Assigning alternate sectors
- Initializing fixed heads (present on some models of MMDs)
- Verifying the disk surface for unusable data fields
- Listing all alternate sector assignments

To use this utility, select the DI utility and then the device containing the disk to be operated. Once you make these selections, choose the operation to be performed from the following:

1. Primary initialization
2. Alternate sector assignment
3. Fixed-head initialization
4. Verification
5. List alternate sector assignments

Whichever operation you select proceeds automatically until completed.

DI provides the previous options for formatting and maintaining sectors on disk surfaces as follows:

- Options 1 and 3 format disk surfaces into sectors and then write the sector ID (sector header) information onto the disk. These options disable the error-correcting hardware. Each sector is written, read, and then compared. If the data that was written does not match the data that was read, the sector is considered bad, and an alternate sector on cylinder 1 is assigned. For option 3, the message ALTERNATE ASSIGNMENTS during fixed-head initialization implies that a bad sector within the fixed-head area was found. No alternate sectors are assigned.

- Option 4 verifies sectors and identifies any bad sectors that are not already assigned an alternate sector. This option also disables the error-correcting hardware, ensuring that all errors are detected regardless of the size of the error. Verify does not assign alternate sectors.

- Option 2 assigns alternate sectors to known bad sectors and moves the data from the bad sectors to the alternate sectors. You normally use this option after using option 4 to identify bad sectors.

  Periodically performing this method of alternate sector assignment (option 4 followed by option 2) significantly decreases the burden of error correction on the hardware. If the DI utility cannot recover the data from the bad sector, the utility allows you to decide whether to place the hexadecimal field FFFF in the alternate sector or to read the data from the bad sector and use it "as is" in the alternate sector.

- Option 5 lists all alternate sectors currently assigned on a disk pack. Use option 5 to identify all currently known bad sectors prior to reinitializing that pack. In reinitializing the disk pack, if some of those sectors pass the tests for defective (bad) sectors, you can refer to the option 5 list to determine which, if any, of the known bad sectors were not detected. You may also use option 2 to assign alternate sectors to any such sectors.

All alternate sectors for a disk pack are in cylinder 1 on that pack. The data in cylinder 1, therefore, is actually part of other cylinders that contain bad sectors. When reading data from a cylinder that has bad sectors, the software automatically reads the data from the corresponding alternate sectors in cylinder 1. When copying or backing up an entire disk, copy all cylinders except cylinder 1, because cylinder 1 data is automatically copied as part of the other cylinder data. To back up a 63-MB disk pack, for example, copy cylinder 0 (extents 000000 through 000459) and then copy cylinders 2 through 822 (extents 002000 through 822459). The CK utility automatically does this backup with the full-copy option.

## DI Utility Procedure

To use the DI utility, perform the following steps:

1. Press the LOAD switch on the console after setting the IPL SOURCE switch on the CPU basic console to the appropriate position.

   The following message appears on the screen:

   ```
   SELECT OPTION ===>
   ```

2. Enter DI and press the carriage return (or ENTER) key. The following messages appear on the screen:

   ```
   CAMBEX DISK INITIALIZATION
   PROGRAM OPTIONS:

      (0) EXIT DISK INITIALIZATION
      (1) PRIMARY INITIALIZATION
      (2) ALTERNATE SECTOR ASSIGNMENT
      (3) FIXED HEADS INITIALIZATION
      (4) VERIFY
      (5) LIST ALTERNATE

   YOUR SELECTION =
   ```

   After the desired option is selected, the utility asks for the device address of the disk with the following message:

   ```
   DEVICE ADDRESS =
   ```

3. You must use a decimal number.

4. Other messages displayed depend on the option selected.

   a. Primary initialization

      If you select option 1, the following message appears on the screen:

```
YOUR SELECTION IS PRIMARY INITIALIZATION
DO YOU WANT TO CONTINUE? =
```

      If you enter YES, the utility performs the primary initialization.

```
**********
* WARNING *
**********
```

      Do not run any other program while you are performing disk initialization. To avoid unpredictable results, do not cancel or stop disk initialization once started.

      If you enter NO, the DI utility returns to step 2.

      During execution of the DI utility, the following appears on the screen:

```
ccc.  (running cylinder count)
ALTERNATE ASSIGNMENT
ccc.tt.ss   xxxxxxxxxxxxxx   (faulty sector)
ccc.tt.ss   ccc.tt.ss   (faulty sector and alternate)
ccc.  (running cylinder count)
```

      The faulty sector is in cylinder.track.sector format.

      This message identifies the cylinder currently being initialized along with the alternates assigned, if any.

   b. Alternate sector assignment

      If you select option 2, the following message appears on the screen:

```
ENTER SECTOR ADDRESS
```

      1) Enter the sector address in ccc.tt.ss format. The DI utility continues to prompt for bad sectors until you indicate that all bad sector addresses are entered.

      2) Press the carriage return (or ENTER) key to indicate all bad sector addresses are entered.

If the DI utility is unable to recover the data to be reassigned from the sector selected, the DI utility allows you either to place the hexadecimal field FFFF into the alternate sector or to read the data again and use the results "as is" with the errors. These options appear on the screen as follows:

```
UNABLE TO RECOVER DATA WITHOUT ERRORS
ASSIGN AND FILL ALTERNATE WITH 'FFFF'?
```

If you enter Y, the alternate sector data fields are filled with hexadecimal field FFFF. If you enter N, the following message appears on the screen:

```
WILL WRITE DATA TO ALTERNATE "AS IS"
DO YOU WISH TO CONTINUE?
```

If your response is N, the DI utility starts again with the ENTER SECTOR ADDRESS message. If your response is Y, the bad sector is read again and the sector's data along with errors is written to the alternate sector. The following message appears on the screen:

```
* * * * * * WARNING * * * * * *
RECOVERED DATA CONTAINS ERRORS
* * * * * * WARNING * * * * * *
```

c. Fixed heads initialization

The messages are the same as for primary initialization.

d. Verify

The messages are the same as for primary initialization.

e. List alternates

If you selected option 5, the following messages appear on the screen:

```
LIST OF ALTERNATES
ccc.tt.ss          ccc.tt.ss          ccc.tt.ss
END ALT LIST
```

The sectors for which alternate sectors have been assigned are displayed in cylinder.track.sector format.

5. When the initialization is completed, the following message appears on the screen:

```
END INITIALIZATION
```

## CMD DISK INITIALIZATION (CI) UTILITY

The CMD Disk Initialization (CI) utility formats and maintains sectors on the Certainty Series Cartridge Module Drives. Each CMD device consists of two distinct, separately addressable units; one fixed and one removable. The fixed module, which is initialized by the factory, has 374 cylinders. The removable cartridge contains space for 74 cylinders, and you must initialize this cartridge. Cylinders on the fixed module are numbered 0 to 373. Cylinders on the removable cartridge are numbered 0 to 73.

Each cylinder consists of 11 tracks. The tracks are numbered 0 to 10.

Each track consists of 33 sectors. Only sectors 0 to 31 are addressable. Sector 32 is a spare sector. If a sector becomes defective, the CI uses sector 32 as an alternate. The first defective sector detected on a track is a primary defect. All subsequent defective sectors on the track are secondary defects. Each sector consists of an ID field, which identifies the sector and its status and two data records. Each data record is 256 bytes in length. Data records are numbered 0 to 63. Data records are interleaved so that sector 0 contains data records 0 and 32 and sector 31 contains data records 31 and 63. The CI utility always refers to sectors by their first data record. If you assign an alternate to 1000052, for example, the CI utility automatically assigns an alternate for sector 1000020. This occurs because sector 20 contains data records 20 and 52. Note that to refer to the spare sector, you should enter 64 as the sector number. You cannot assign alternates for spare sectors, but you can mark spare sectors as defective.

The CI utility provides several processing options for formatting and maintaining sectors on fixed module and removable cartridge surfaces. The processing options are as follows:

- Option 1 formats disk surfaces into sectors and writes the sector ID (sector header) information onto the disk. This option also disables error-correcting hardware. Each sector is written, read, and then compared. If data written does not match data read, the CI utility considers the sector defective and, if necessary, reassigns an alternate. The disk hardware automatically accesses the assigned alternate sector in place of the defect. Note that option 1 treats fixed modules and removable cartridges differently. On the fixed module, any errors the CI utility detects are carried forward. This ensures there is no chance of a defect disappearing during subsequent primary initializations once the CI utility has detected the defect. This is not the case for defects that you assign. Subsequent primary initializations can cause such user-defined defects to disappear. On the removable cartridge, no defects are carried forward under option 1. All primary initializations of removable cartridges start from scratch. (See option 4.)

- Option 3 verifies sectors and identifies any bad sectors that are not already assigned alternate sectors. This option also disables the error-correcting hardware, ensuring that all errors are detected regardless of the severity of the error. Run this option immediately following any abnormal termination of the CI utility.

- Option 2 assigns alternate sectors for user-defined defects and moves the data from the bad sectors to the alternate sectors. Normally, you use option 2 after option 3 has been used to identify bad sectors. Periodically performing this method of alternate sector assignment (option 3 followed by option 2) significantly decreases the burden of error handling on the hardware. Note that the utility performs an exhaustive set of retry algorithms to recover the data. If the data cannot be recovered error-free, the utility notifies you and transfers the data as last read.

- Option 4 maps all defects currently identified on a disk. You can direct the disk output to a printer for saving. You should run option 4 before and after each primary disk initialization. In reinitializing the removable cartridge, if previously detected defects pass the tests for defective (bad) sectors, you can refer to the option 4 list to determine which, if any, of the known defects were not detected. You can then use option 2 to assign the defects alternate sectors. Note that the list identifies primary defects and, in the case of secondary defects, the appropriate assigned alternate sectors. The list also indicates which defects, if any, had defective ID areas. Do not be alarmed if a sector appears twice on the list. This can be the result if two sectors in a row are defective and the first is a primary defect. For example, assume the following output from option 4:

```
*****DEFECTIVE SECTOR MAP*****
0000019
0000108
0000108     0000232      *
```

The map is interpreted as follows:

- 0000019 is a primary defect. It and all sectors to the end of the track are displaced one sector over from their normal position. The spare sector on that track has been used.

- 0000108 is a primary defect. It and all sectors to the end of the track are displaced one sector over from their normal position. The spare sector on that track has been used. In addition, the sector immediately following the primary defect is a secondary defect. Hence, that sector (the now displaced 0000108) is assigned an alternate. The alternate sector for 0000108 is 0000232. The asterisk indicates that the secondary defect has a defective ID area.

CI Utility Procedure

To load and use CI utility, perform the following steps:

1. Press the LOAD switch on the console after setting the IPL SOURCE switch on the CPU basic console to the appropriate position.

   The following message appears on the screen:

   ```
   SELECT OPTION ===>
   ```

2. Enter CI and press the carriage return (or ENTER) key. The following message appears on the screen:

```
CMD INITIALIZATION UTILITY
PROGRAM OPTIONS:
   (0)  EXIT DISK INITIALIZATION
   (1)  PRIMARY INITIALIZATION
   (2)  ALTERNATE SECTOR ASSIGNMENT
   (3)  VERIFY
   (4)  MAP DEFECTS

YOUR SELECTION >
```

3. Enter the number for desired option. Press the carriage return (or ENTER) key.

   a. Option 0, Exit Disk Initialization

      Enter 0. Press the carriage return (or ENTER) key. The following message appears on the screen:

      INITIALIZE UTILITY TERMINATED

   b. Option 1, Primary Initialization

      1) Enter 1. Press the carriage return (or ENTER) key. The following message appears on the screen:

         DISK ADDRESS=>

      2) Enter the address (in decimal) for the CMD that you want to initialize. Press the carriage return (or ENTER) key. The following message appears on the screen:

         YOUR SELECTION IS PRIMARY INITIALIZATION
         ALL DATA ON THIS DISK WILL BE LOST IF YOU CONTINUE
         DO YOU WISH TO CONTINUE?

      3) Enter NO if you do not want to continue. Enter YES if you want to continue. Press the carriage return (or ENTER) key. If you enter NO, the option menu appears on the screen.

```
**********
* WARNING *
**********
```

Use of the CE option destroys all reassigned sectors, including the flawed sectors used and set by manufacturing. Both alternate assignment lists should be available before using this option.

During initialization, the screen displays the current cylinder. If the CI utility assigns secondary defects, the following message appears on the screen:

'XXXXXXX IS THE ALTERNATE TO YYYYYYY'

When initialization is finished, the following message appears on the screen:

PRIMARY INITIALIZATION COMPLETE

The program option menu is then displayed.

c. Option 2, Alternate Sector Assignment

1) Enter 2. Press the carriage return (or ENTER) key. The following message appears on the screen:

DISK ADDRESS =>

2) Enter the address (in decimal) for the CMD device. The following message appears on the screen:

ENTER cccttss OF DEFECTIVE SECTOR OR END>

3) Enter END and press the carriage return (or ENTER) key to end this option.

The option menu appears on the screen.

4) Enter the cccttss of the defective sector and press the carriage return (or ENTER) key to continue. If the defect is a primary defect, the following message appears on the screen:

cccttss MARKED DEFECTIVE

5) The previous message reappears, and you may enter another defective sector.

If the defective sector is a secondary defect, the following message appears on the screen:

cccttss MARKED DEFECTIVE
cccttss IS THE ALTERNATE TO cccttss

d. Option 3, Verify

1) Enter 3. Press the carriage return (or ENTER) key. The following message appears on the screen:

DISK ADDRESS=>

2) Enter the address (in decimal) for the CMD device. The following message appears on the screen:

*** WAIT *** DISK VERIFICATION IN PROGRESS

If there are no problems, the program option menu is displayed when verification is completed.

If the program encounters format-related problems, one of the following two messages appears on the screen:

ECC ERROR READING SECTOR XXXXXXX
or
NRF ERROR READING SECTOR XXXXXXX

If the CI utility identifies a sector as having ECC errors, you should immediately assign an alternate sector. Use option 2 for this purpose.

If the utility identifies a sector as having NRF errors, back up the data on the disk to another unit and use option 1 to reinitialize the disk's format.

e. Option 4, Map Defects

1) Enter 4. Press the carriage return (or ENTER) key. The following message appears on the screen:

DISK ADDRESS=>

2) Enter the address (in decimal) for the CMD device. Press the carriage return (or ENTER) key. The following message appears on the screen:

PRINTER ADDRESS =>

Enter the address (in decimal) for the printer. Press the carriage return (or ENTER) key. Enter 0 to have the defects listed on the screen.

When the defects are printed, the program options reappear on the screen.

## WREN DISK (WI) INITIALIZATION UTILITY

The WREN Disk Initialization (WI) utility formats and maintains sectors on the Cambex 80220 Rigid Disk Drive (RDD). The disk surface contains a total of 376 logical cylinders with 11 logical tracks per cylinder. The useable cylinders are numbered 0 to 375. Cylinder 376 is the assigned alternate cylinder. The tracks are numbered 0 to 10.

Each physical track contains 66 sectors. The sectors are numbered 0 to 65, with sectors 32 and 65 reserved as spare sectors. Only sectors 0 through 31 and 33 through 64 of each physical track are directly addressable. The two spare sectors of each logical track allow on-track reassignment of defective primary sectors on each track. When the spare sectors of a track are not available for assignment (the sectors were marked defective or were already reassigned a primary sector), the alternate cylinder provides the off-track assignment capability for defective sectors.

Interleaving is the organization of logical sectors on a track to affect disk performance. An interleave factor is the number of revolutions the disk must make before the read/write head is above the correct next logical sector to be accessed. When the logical sectors of a track are organized consecutively, the interleave factor is 1. An interleave factor of 1 is not used often because the drive has accessed the first sector, the next consecutive sector has passed under the read/write head before the head is ready to access the sector. The disk surface, therefore, must make a complete revolution before the head can access the next logical sector.

To overcome the read/write head-processing time delay between sectors, gaps can be added to physically separate consecutive logical sectors. These gaps provide space (and processing time) between logical sectors for the read/write head to get into position for the next logical sector. The read/write head, therefore, can always be ready for the next logical sector.

To get as many logical sectors on each track as possible, the gaps provide the space for sectors. For example, with an interleave factor of 2, the logical sectors are organized as follows: 0, 16, 1, 17, 2, 18, . . . 30, 15, 31. This convention provides a read/write head-processing time between logical consecutive sectors. The read/write head reads and processes logical sector 0 while the next physical sector (labelled logical sector 16) passes by. The read/write head is ready to read and process the next physical sector when the sector labelled logical sector 1 appears. A drive with an interleave factor of 2, therefore, is the optimal format because the read/write head needs to make only two passes (two revolutions of the entire disk surface) to read the entire track.

For certain applications, you may require a different interleave factor for optimum format and performance. Perhaps you need a read/write processing time between logical sectors equal to two sectors. An interleave factor of 3, therefore, is appropriate. An interleave factor of 3 organizes the sectors as follows: 0, 11, 22, 1, 12, 23, 2, 13, 24 . . . 31, 10, 21. Note that two logical sectors (11 and 22) pass under the read/write head during reading and processing of the accessed sector (0) information.

The WI utility provides several processing options for formatting and maintaining sectors on a fixed disk. The processing options include the following:

- Option 1 formats the disk surface into sectors and writes the sector ID (sector header) information to the disk. The option disables the error-correction hardware during formatting and writes, reads, and then compares each sector. If the read data does not match the written data, the utility considers the sector defective and reassigns an alternate sector, if necessary. The disk hardware automatically accesses the assigned alternate sector when directed to access the sector marked defective.

- Option 2 assigns alternate sectors for user-defined defects and moves data from the defective sectors to the alternate sectors. Option 2 is usually used after option 3 (sector verification), which identifies defective sectors. By performing option 3 followed by option 2, you can identify defective and marginal sectors, and assign alternate sectors.

- Option 3 verifies sectors and identifies any defective sectors not previously identified. The option disables the error-correction hardware to ensure that all errors are detected, regardless of the severity of the error.

- Option 4 maps all primary defects currently identified on the fixed disk. The listed primary defects are sectors having a defective data area. The utility displaces sectors with a defective ID area 64 bytes within the sector. The utility does not identify sectors with a defective ID area unless the defect still existed within the sector after displacement. The utility output shows both the primary defects that were displaced (into the spare sector) and the primary defect that was reassigned to the alternate cylinder. Displaced defects appear as a single sector number. Reassigned defects assigned to the alternate cylinder appear as two numbers. The first number is the primary defective sector number. The second number is the alternate sector number to which the primary defect was assigned.

WI Utility Procedure

To load and use the WI Utility, complete the following steps:

1. Set the IPL SOURCE switch on the CPU basic console to the appropriate position. Press the LOAD switch on the console.

   The following message appears on the screen:

   SELECT OPTION = >

2. Enter WI and press the carriage return (or ENTER) key. The following message appears on the screen: WREN INITIALIZATION UTILITY

```
PROGRAM OPTIONS

     (0)  EXIT DISK INITIALIZATION
     (1)  PRIMARY INITIALIZATION
     (2)  ALTERNATE SECTOR ASSIGNMENT
     (3)  VERIFY
     (4)  MAP DEFECTS

YOUR SELECTION >
```

3. Enter the number for the desired option. Press the carriage return (or ENTER) key.

   a. Option 0, Exit Disk Initialization

      Enter 0. Press the carriage return (or ENTER) key. The following message appears on the screen:

      ```
      INITIALIZE UTILITY TERMINATED
      ```

   b. Option 1, Primary Initialization

      1) Enter 1. Press the carriage return (or ENTER) key. The following message appears on the screen:

         ```
         DISK ADDRESS=>
         ```

      2) Enter the address (in decimal) for the WREN you want to initialize. Press the carriage return (or ENTER) key. The following message appears on the screen:

         ```
         INTERLEAVE = >
         ```

      3) Enter the sector interleave factor, specifying the format of logical sectors on the disk. Valid interleave factors are 1, 2, 3, 4, 5. Select the default interleave factor 2 by pressing the Carriage Return/Enter key.

         ```
         YOUR SELECTION IS PRIMARY INITIALIZATION
         ALL DATA ON THIS DISK WILL BE LOST IF YOU
         CONTINUE
         DO YOU WISH TO CONTINUE?
         ```

      4) Enter NO if you do not want to continue. Enter YES if you want to continue. Press the carriage return (or ENTER) key.

         If you enter NO, the option menu appears on the screen.

During initialization, the screen displays the current cylinder. If the WI utility assigns secondary defects, the following message appears on the screen:

'XXXXXXX IS THE ALTERNATE TO YYYYYYY'

When initialization is finished, the following message appears on the screen:

PRIMARY INITIALIZATION COMPLETE

The program option menu is then displayed.

c. Option 2, Alternate Sector Assignment

1) Enter 2. Press the carriage return (or ENTER) key. The following message appears on the screen:

DISK ADDRESS = >

2) Enter the address (in decimal) for the WREN device. The following message appears on the screen:

ENTER cccttss OF DEFECTIVE SECTOR OR END>

3) Enter END and press the carriage return (or ENTER) key to end this option. The option menu appears on the screen.

To continue, enter the cccttss of the defective sector, and press the carriage return (or ENTER) key. If the defect is a primary defect, the following message appears on the screen:

cccttss MARKED DEFECTIVE

4) The previous message reappears, and you may enter another defective sector.

If the defective sector is a secondary defect, the following messages appear on the screen:

cccttss MARKED DEFECTIVE
cccttss IS THE ALTERNATE TO cccttss

d. Option 3, Verify

1) Enter 3. Press the carriage return (or ENTER) key. The following message appears on the screen:

DISK ADDRESS=>

2) Enter the address (in decimal) for the WREN device. The following message appears on the screen:

*** WAIT *** DISK VERIFICATION IN PROGRESS

If there are no problems, the program option menu is displayed when verification is completed.

If the program encounters format-related problems, one of the following two messages appears on the screen:

ECC ERROR READING SECTOR XXXXXXX

or

NRF ERROR READING SECTOR XXXXXXX

If the WI utility identifies a sector as having ECC errors, you should immediately assign an alternate sector. Use option 2 for this purpose.

e. Option 4, Map Defects

1) Enter 4. Press the carriage return (or ENTER) key. The following message appears on the screen:

DISK ADDRESS=>

2) Enter the address (in decimal) for the WREN device. Press the carriage return (or ENTER) key. The following message appears on the screen:

PRINTER ADDRESS=>

3) Enter the address (in decimal) for the printer. Press the carriage return (or ENTER) key. Enter 0 to have the defects listed on the screen.

When the defects are finished being printed, the program options reappear on the screen.

## EMD DISK (EI) INITIALIZATION UTILITY

The EMD Disk Initialization (EI) utility provides several processing options for formatting and maintaining sectors on the Cambex 80250-10, -15, and -20 Eight inch Module Drives (EMDs). The processing options include the following:

- Option 1 formats the disk, assigns alternates to any sectors found defective by the factory, followed by a complete surface analysis. If during the surface analysis any additional defects are found, alternates will be assigned. Note that the EMDs have been initialized before being shipped to you, hence a primary initialization should not be necessary.

- Option 2 assigns alternate sectors for those sectors found to be defective and moves the data from the bad sector to the alternate sector. Note that the utility performs an exhaustive set of retry algorithms to recover the data. If the data cannot be recovered error-free, the utility notifies you that the alternate was assigned but the data was not recovered. Normally, you use option 2 after option 3 has been used to identify bad sectors.

- Option 3 verifies sectors and identifies any defective sectors not previously identified. This option disables the error-correction hardware to ensure that all errors are detected, regardless of the severity of the error.

- Option 4 maps all defects currently identified on an EMD. You can direct the disk output to a printer for saving. You should run option 4 before and after each primary disk initialization. In reinitializing the EMD, if previously detected defects pass the test for defective (bad) sectors, you can refer to the option 4 list to determine which, if any, of the known defects were not detected. You can then use option 2 to assign alternates to the defective sectors.

- Option 5 sets the number of additional records read into cache everytime a disk read is performed. The default for this option is 4.

### EI UTILITY PROCEDURE

To load and use the EI utility, complete the following steps:

1. Set the IPL SOURCE switch on the CPU basic console to the appropriate position. Press the LOAD switch on the console. The following message appears on the screen:

```
SELECT OPTION =>
```

2. Enter EI and press the carriage return (or ENTER) key. The following message appears on the screen:

```
PROGRAM OPTIONS:

    (0)  EXIT DISK INITIALIZATION
    (1)  PRIMARY INITIALIZATION
    (2)  ALTERNATE SECTOR ASSIGNMENT
    (3)  VERIFY
    (4)  MAP DEFECTS
    (5)  MODIFY PREFETCH

YOUR SELECTION >
```

3. Enter the number for the desired option. Press the carriage return (or ENTER) key.

   a. Option 0, Exit Disk Initialization

      Enter 0. Press the carriage return (or ENTER) key. The following message appears on the screen:

```
INITIALIZE UTILITY TERMINATED
```

      To reuse this utility or another utility, you must first re-IPL.

   b. Option 1, Primary Initialization

      1) Enter 1. Press the carriage return (or ENTER) key. The following message appears on the screen:

```
DISK ADDRESS(in decimal) =>
```

      2) Enter the address (in decimal) for the EMD you want to initialize. Press the carriage return (or ENTER) key. The following message will appear on the screen:

```
YOUR SELECTION IS PRIMARY INITIALIZATION

*********************************************
*              WARNING !!!                  *
* THIS UTILITY SHOULD ONLY BE USED WHEN     *
* THE HDA HAS BEEN REPLACED.  ALL 80250-XX  *
* DISK SUBSYSTEMS HAVE ALREADY BEEN PRIMARY *
* INITIALIZED AT THE FACTORY.               *
*********************************************

DO YOU WISH TO CONTINUE?
```

      3) Enter NO to return to the option menu. To continue, enter YES and press the carriage return (or ENTER) key. The following message will appear on the screen:

```
ALL DATA ON THIS DISK WILL BE LOST IF YOU CONTINUE
DO YOU WISH TO CONTINUE?
```

4) Enter NO to return to the option menu.

   To continue, enter YES and press the carriage return (or ENTER) key. If the device has never been initialized or the HDA has been replaced continue at step 8. Note that if the EMD is being re-initialized that all customer assigned flaws will be lost. It is recommended that a hardcopy of the defect list be obtained, using Option 4, before proceeding with the re-initialization. If the device has been previously initialized the following message will appear on the screen:

```
THIS DEVICE HAS ALREADY BEEN INITIALIZED
ALL DATA AND CUSTOMER ASSIGNED FLAWS ON THIS DISK
WILL BE LOST IF YOU CONTINUE.
DO YOU WISH TO CONTINUE?
```

5) Enter NO and press the carriage return (or ENTER) key to return to the option menu.

   To continue, enter YES and press the carriage return (or ENTER) key. The following message will appear on the screen:

```
USE THE FACTORY FLAW DATA SAVED ON THIS DISK
DURING THE PREVIOUS INITIALIZATION?
```

6) Enter NO and press the carriage return (or ENTER) key if the factory flaw data was entered incorrectly during the previous initialization (i.e. not all of the factory flaws were entered or the flaws were not entered in ascending order). The factory flaws must be re-entered. Continue at step 8.

   Enter YES and press the carriage return (or ENTER) key to use the factory flaw information saved on the disk during the previous initialization.

   If the factory flaw data was unable to be read from disk the factory flaws must be re-entered and the following message will appear on the screen:

```
FLAW DATA FROM DISK IS UNAVAILABLE
FACTORY FLAW DATA MUST BE ENTERED MANUALLY
```

   then, continue at step 8.

   If the factory flaws were available from disk the following message will appear on the screen:

```
VERIFY THE FACTORY FLAW DATA IS CORRECT?
```

7) Enter NO and press the carriage return (or ENTER) key if the factory flaws are known to be correct. Continue at step 11.

   Enter YES and press the carriage return (or ENTER) key to verify the factory flaw data retrieved from disk. Continue at step 10.

8) If the disk has never been initialized, the HDA has been replaced, or if the factory flaw data must be re-entered the following message will appear on the screen:

```
FACTORY FLAW INFORMATION
ENTER FLAW CYL,HEAD,DISP OR END TO CANCEL:
```

9) NOTE: If the HDA has been replaced use the media defect list that was shipped with the HDA. Enter the first entry from the factory MEDIA DEFECT LIST. Press the carriage return (or ENTER) key. The previous message will be displayed on the screen. Repeat this step for each of the entries from the factory MEDIA DEFECT LIST.

Enter END and press the carriage return (or ENTER) key when all of the defects from the list have been entered.

10) The following messages will appear on the screen:

```
FOLLOWING IS A LIST OF THE FLAWS TO BE REASSIGNED
DURING PRIMARY INITIALIZATION.  AFTER EACH OF THE FLAWS
ARE DISPLAYED YOU ARE PROMPTED WHETHER THE FLAW DATA IS
CORRECT:  OK? (Y/N)
ENTER "Y" IF THE FLAW DATA IS CORRECT.
ENTER "N" IF THE FLAW DATA IS INCORRECT.  YOU WILL THEN
BE PROMPTED TO ENTER THE CORRECT FLAW DATA.
** NOTE - THE FLAWS MUST BE ENTERED IN ASCENDING ORDER **
```

After the entire factory flaw list is verified to be correct the following message will appear on the screen:

```
END OF FLAWS
```

11) The following messages will be displayed on the screen:

```
*** WARNING *** IF THIS PROGRAM IS ABORTED FOR ANY
REASON DURING THE INITIALIZATION PROCESS THIS DISK MUST
BE RE-INITIALIZED

** WAIT ... DISK INITIALIZATION IN PROGRESS ***
```

The initialization process takes approximately one hour and twenty minutes. After a successful completion of the initialization process the following message will be displayed on the screen:

```
PRIMARY INITIALIZATION COMPLETE
```

The option menu will then be re-displayed.

NOTE: It is recommended that a current list of the defects be printed (disregard the rest of this note if the HDA was replaced). Compare the current defect map with the defect map that was listed prior to re-initialization. Assign an alternate, using Option 2, for any defective sectors listed on the old defect list that are not listed on the current defect list.

c. Option 2, Alternate Assignment

1) Enter 2. Press the carriage return (or ENTER) key. The following message appears on the screen:

```
DISK ADDRESS(IN DECIMAL) =>
```

2) Enter the address (in decimal) for the EMD device. The following messages appears on the screen:

```
ALTERNATE SECTOR ASSIGNMENT

** NOTE:  ALL RBA'S MUST BE ENTERED IN DECIMAL
ENTER RBA OF DEFECTIVE SECTOR OR END TO CANCEL:
```

3) To continue, enter the RBA (in decimal) of the defective sector, and press the carriage return (or ENTER) key. Then the previous message reappears, and you may enter another defective sector or END to end the utility.

Enter END and press the carriage return (or ENTER) key to end this option. The following message is displayed on the screen:

```
ALTERNATE SECTOR ASSIGNMENT OPTION ENDED
```

The option menu is then displayed on the screen.

d. Option 3, Verify

1) Enter 3. Press the carriage return (or ENTER) key. The following message appears on the screen:

```
DISK ADDRESS(in decimal) ==>
```

2) Enter the address (in decimal) for the EMD device. The following messages appear on the screen:

```
DISK VERIFICATION SELECTED

** NOTE:  ALL RBA'S MUST BE ENTERED IN DECIMAL
ENTER STARTING RBA (NULL TO VERIFY THE ENTIRE DISK):
```

3) To verify the entire disk press the carriage return (or ENTER) key. It takes approximately twenty minutes to verify the entire disk. Continue at step 5.

To give the RBA of where the verification is to begin enter the starting RBA (in decimal). Press the carriage return (or ENTER) key. The following message will appear on the screen:

```
ENTER ENDING RBA (NULL TO VERIFY TO THE END OF THE DISK)
```

4) To verify to the end of the disk press the carriage return (or ENTER) key.

   To give the RBA of where the verification is to end enter the ending RBA (in decimal). Press the carriage return (or ENTER) key.

5) The following message will appear on the screen:

```
*** WARNING ... DO NOT ABORT THIS PROGRAM UNTIL
THE VERIFY HAS COMPLETED

*** WAIT *** DISK VERIFICATION IN PROGRESS
RBA OF SECTOR IN ERROR      ERROR DESCRIPTION
```

   If the program is aborted for any reason before the verify has completed, the verify must be run again. If the program encounters any defective sectors the program will list the RBA (in decimal) of the defective sector along with a description of the error. If any defective sectors are listed, use option 2, Alternate Sector Assignment, to assign the alternates.

   When the disk verification is complete the following message will appear on the screen:

```
DISK VERIFICATION COMPLETE
```

   The option menu is then displayed on the screen.

e. Option 4, Map Defects

1) Enter 4. Press the carriage return (or ENTER) key. The following message appears on the screen:

```
DISK ADDRESS(in decimal) =>
```

2) Enter the address (in decimal) for the EMD device. Press the carriage return (or ENTER) key. The following message appears on the screen:

```
PRINTER ADDRESS =>
```

3) Enter the address (in decimal) of the printer or terminal of where the defects should be listed. Enter a "0" to direct the listing to the programmers console. The following message will then be displayed on the screen:

MAP DEFECTS

A list of the RBA's (in decimal) of the sectors that have been assigned alternates will appear on the screen. If the following message appears on the screen:

HIT ENTER TO SCROLL THE SCREEN

Press the carriage return (or ENTER) to scroll the screen to display the next screen of defects. When all the defects have been listed the option menu will be displayed on the screen.

f. Option 5, Modify Prefetch

1) Enter 5. Press the carriage return (or ENTER) key. The following message appears on the screen:

DISK ADDRESS(in decimal) =>

2) Enter the address (in decimal) for the EMD device. Press the carriage return (or ENTER) key. The following messages along with the current value of the prefetch appears on the screen:

THE NUMBER OF RECORDS PREFETCHED IS XX
WOULD YOU LIKE TO MODIFY (Y/N)?

Enter "N" and press the carriage return (or ENTER) key to return to the option menu.

To modify the value of the prefetch, enter "Y" and press the carriage return (or ENTER) key and the following message will appear on the screen:

ENTER THE NUMBER OF RECORDS TO PREFETCH:

Enter the number of records to prefetch (in decimal) and hit the carriage return (or ENTER) key. The option menu will then be re-displayed.

## DISKETTE INITIALIZATION (KI) UTILITY

The Diskette Initialization (KI) utility formats the diskette into formatted cylinders and writes the volume identification and the owner identification information onto the diskette. You can format the diskette surface at single density into 128-byte sectors, 256-byte sectors, or 512-byte sectors. At double density, you can format the diskette surface into 256-byte sectors, 512-byte sectors, or 1024-byte sectors. If a cylinder is defective, the utility assigns an alternate cylinder. If more than two cylinders are defective, the entire diskette becomes unusable. The KI utility supports the diskette units listed in table 1-2.

### KI Utility Procedure

To use the KI utility, perform the following steps:

1. Press the LOAD switch on the console after setting the IPL SOURCE switch on the CPU basic console to the appropriate position.

   The following message appears on the screen:

   ```
   SELECT OPTION ===>
   ```

2. Enter KI and press the carriage return (or ENTER) key. The following message appears on the screen:

   ```
   *WAIT*LOADER*PROCESSING*
   CAMBEX DISKETTE INITIALIZATION
   ENTER DISKETTE ADDRESS IN DECIMAL:
   ```

   This address refers to the diskette that you want to initialize.

   When you have entered an acceptable response to the ENTER DISKETTE ADDRESS query, the KI utility responds. If the device supports only single density, the following message appears on the screen:

   ```
   SELECT SECTOR SIZE (1=128, 2=256, 3=512)
   ```

   If the device supports both single and double density, the following message appears on the screen:

   ```
   SELECT SECTOR SIZE (1=128, 2=256, 3=512, 4=256D, 5=512D, 6=1024D):
   ```

3. Enter 1, 2, 3, 4, 5, or 6 to reflect the required number of bytes per sector. Press the carriage return (or ENTER) key. The following message appears on the screen:

   ```
   ENTER VOLID:
   ```

4. Enter a volume identification consisting of any characters up to six (the volume ID NONAME is placed as default). Press the carriage return (or ENTER) key. The following message appears on the screen:

   ```
   ENTER OWNER ID
   ```

5. Enter the owner ID (up to 14 characters). Press the carriage return (or ENTER) key. A blank field is placed as default. The following message appears on the screen:

```
FORMATTING WILL DESTROY ALL DATA ON THE DISKETTE
ENTER 'YES' TO CONTINUE:
```

If you enter NO, the utility prompts for a diskette address:

```
CAMBEX DISKETTE INITIALIZATION
ENTER DISKETTE ADDRESS IN DECIMAL:
```

If you enter YES, the following message appears on the screen:

```
*** DISKETTE INITIALIZATION *** PROCESSING ***
```

6. When the utility finishes initializing the diskette, the utility returns you to the prompts for a diskette address:

```
CAMBEX DISKETTE INITIALIZATION
ENTER DISKETTE ADDRESS IN DECIMAL:
```

If the utility encounters an unrecoverable I/O error, it terminates. To reinvoke the KI utility, you must IPL the system again.

## IDENTIFY DEVICES (ID) UTILITY

The Identify Devices (ID) utility lists to the terminal all device currently attached to the system along with their associated device addresses (in decimal). Table 2-1 gives the device ID list with the supported device addresses and IDs as returned to the basic console.

### ID Utility Procedure

To load and use the ID utility, perform the following steps:

1. Press the LOAD switch on the console after setting the IPL SOURCE switch on the CPU basic console to the appropriate position.

   The following message appears on the screen:

   ```
   SELECT OPTION ===>
   ```

2. Enter ID and press the carriage return (or ENTER) key.

   The following message appears on the screen:

   ```
   DEVICE-ID LIST
   ```

A display of the actual list of devices follows this message. To use this utility or another utility, you must first re-IPL.

TABLE 2-1. DEVICE-ID LIST

| ID | DEVICE |
|---|---|
| 0010 | TTY |
| 0206 | 4974 Printer or Cambex Matrix Printer |
| 0306 | 4973 Band Printer or Cambex Band Printer |
| 0106 | 4964 Diskette Drive or 80210 FDD |
| 5212 | 4965 Diskette Drive |
| 00AA | MMD Disk 9.3 MB |
| 00AA | 4962 Disk, Mod 1,2 |
| 00BA | 4962 Disk, Mod 1F, 2F |
| 00CA | MMD Disk, 13.9 MB |
| 00CA | 4962 Disk, Mod 3,4 |
| 3007 | SMD Disk, 63.2 MB |
| 3007 | MMD Disk, 63.2 MB |
| 3107 | SMD Disk, 240.2 MB |
| 3107 | MMD Disk, 126.6 MB |
| 3017 | MMD Disk, 63.2 MB with 1.48 MB FH |
| 0126 | 4966 Diskette Magazine |
| 3106 | 4963 Disk (1-2 Devices) |
| 3106 | CMD Disk, Fixed |
| 3106 | CMD Disk, Cartridge |
| 3106 | RDD Disk, 64.5 MB |
| 3206 | 4963 Disk (3-4 Devices) |
| 0028 | Timer Feature |
| 040E | 4978 Display |
| 0406 | 4979 Display or 80610 Viking Display |
| 0416 | 5250 Display |
| 100E | 3101 ASYN Single Line |
| 210E | 3101 ASYN Two Line |
| 220E | 3101 ASYN Four Line |
| 230E | 3101 ASYN Six Line |
| 200E | 3101 ASYN Eight Line |
| 2116 | 3101 PGM Two Line |
| 2216 | 3101 PGM Four Line |
| 2316 | 3101 PGM Six Line |
| 2016 | 3101 PGM Eight Line |
| 2036 | 3101 PGM Eight Line |
| 3136 | Multi-Function Feature (1-2 Devices) |
| 3236 | Multi-Function Feature (3-4 Devices) |
| 3186 | 4969 Magnetic Tape Subsystem (1-2 Devices) |
| 3286 | 4969 Magnetic Tape Subsystem (3-4 Devices) |
| 3187 | 80810 Tape Streamer or 80820 Tape Streamer |
| 3116 | 4967 Disk, 200 MB or 358.9 MB |
| 3116 | EMD Disk, 200 MB or 276.5 MB |
| 3116 | EMD Disk, 512 MB |
| 3216 | 4967 Disk, 200 MB (3-4 Devices) |
| 3216 | 4967 Disk, 358.9 MB (3-4 Devices) |
| 3216 | EMD Disk, 200 MB (3-4 Devices) |
| 3216 | EMD Disk 276.5 MB (3-4 Devices) |
| 3216 | EMD Disk 512 MB (3-4 Devices) |
| 5152 | 30D or 60D IBM Disk |
| 2202 | IBM IDISK(ETTE) (1-4 Devices) |
| 2302 | IBM IDISK(ETTE) (5-8 Devices) |

## DISK/TAPE TO TAPE/DISK (TP) UTILITY

The Disk/Tape to Tape/Disk (TP) utility performs several utility functions. The utility saves data from disk to tape, restores data from tape to disk, erases the contents of a tape, retentions a tape, verifies that a tape can be read, and certifies that a tape can be written to and read from accurately. The utility supports making either full or partial copies.

The utility supports the Cambex 80810-10 and 80820-10 Cartridge Tape Streamer Subsystem(s) attached to the following IBM Series/1 computers:

- IBM 4952
- IBM 4953
- IBM 4954
- IBM 4955
- IBM 4956

### TP Utility Procedure

To load and use the TP utility, perform the following steps:

1. After setting the IPL SOURCE switch on the CPU basic console to the appropriate position, press the LOAD switch on the console.

   The following message appears on the screen:

   ```
   SELECT OPTION ===
   ```

2. Enter TP and press the carriage return (or ENTER) key. The utility issues the following prompt:

   ```
   ENTER TAPE DEVICE ADDRESS:
   ```

   Respond to the utility prompt by entering the device address of the cartridge tape. Use decimal format for the tape device address.

   If the tape unit has dual drives, then the following message is issued:

   ```
   THIS TAPE SYSTEM IS EQUIPPED WITH (2) 125 MB TAPE DRIVES.  IT MAY BE USED
   AS A DUAL DRIVE SYSTEM BY ALLOWING THE SOFTWARE TO AUTOMATICALLY SWITCH
   FROM DRIVE 1 TO DRIVE 2  WHEN IT REACHES THE END OF THE TAPE ON DRIVE 1.
   YOU MAY ALSO CHOOSE TO USE IT AS A SINGLE DRIVE UNIT BY SELECTING DRIVE 1
   OR DRIVE 2.  IF THIS TAPE UNIT IS TO BE USED AS A DUAL DRIVE, BOTH DRIVES
   MUST HAVE CARTRIDGES INSERTED IN THEM BEFORE OPERATION CAN BEGIN.
   ```

   The utility then issues the following prompts:

   ```
   USE THIS UNIT AS A DUAL DRIVE?:
   ```

   Enter a 'YES' if both the drives on the unit are to be used. If a 'NO' is entered, the utility issues the following prompt:

   ```
   USE DRIVE 1 ONLY?:
   ```

Enter a 'YES' if only drive 1 of the dual drives is to be used. If a 'NO' is entered the utility issues the prompt:

```
USE DRIVE 2 ONLY?:
```

If a 'YES' is entered, the utility displays the option menu as follows:

```
CAMBEX DISK/TAPE UTILITY
PROGRAM OPTIONS

(0)  EXIT
(1)  SAVE *
(2)  RESTORE *
(3)  ERASE **
(4)  RETENTION
(5)  VERIFY
(6)  CERTIFY **

SELECT OPTION:
```

NOTE FOR STANDALONE UTILITIES WHICH ARE LOADED FROM TAPE

* To perform the SAVE or RESTORE option following an IPL, enter an asterisk (*) after the number of the option (e.g. 1* or 2*). For additional SAVE or RESTORE commands the asterisk (*) MUST be omitted.
If the IPLable tape is not rewound there will be a slight delay before the SAU option menu is displayed.
When doing the first SAVE or RESTORE to an IPLable tape, there is a slight delay before the following message is displayed:

```
*** WAIT *** TAPE SAVE/RESTORE IN PROGRESS ***
```

If you want to change the option from a SAVE to a RESTORE or vice-versa, the tape must first be re-IPL'd.

** Do not use the erase or certify options on an IPLable tape as the loader and programs will be erased.

3. Enter the number of the appropriate option. Respond to the prompts issued by the utility for each option, as discussed in the following paragraphs.

Option 0 - Exit the Disk/Tape Utility

The exit option provides a means to leave the utility after completion of utility option execution. To use the exit option, complete the following steps:

1. Enter the option number 0 in response to the following utility prompt:

```
SELECT OPTION:
```

The utility issues the following response to the request to leave the disk/tape utility:

```
TAPE PROGRAM ENDED
```

## Option 1 - Save Disk to Tape

The save option copies the contents of the specified disk to the streamer tape. You can execute a single save to tape or multiple saves to tape. If you want to save the contents of several disks to a single tape, you must execute all saves at the same time. This is because when you exit from the save option, the tape rewinds to the beginning-of-tape position. If you want to rewind the tape during a multiple save, you must change your option or perform an IPL.

1. Invoke the save option by entering option number 1 or 1* (see note on page 2-37) in response to the following utility prompt:

   SELECT OPTION:

   After receiving the option number, the utility issues the following prompt:

   ENTER FROM (DISK) DEVICE ADDRESS OR (CTS*/RBA** FORMAT):

   Five possible (CTS*/RBA**) formats describe the copy from/to the disk device:

   - Full copy
   - Full fixed heads copy
   - Partial fixed heads copy
   - Partial copy for a CTS* device
   - Partial copy for an RBA ** device

   The possible formats are as follows:

| CTS Format | Description |
|---|---|
| a | Full copy (CTS*/RBA**) |
| aa | |
| aaa | |
| F,a | Full fixed heads copy |
| F,aa | |
| F,aaa | |
| F,aaa,tss,tss | Partial fixed heads copy |
| F,aaa,ttss,ttss | |
| aaa,ccctss,ccctss | Partial copy for a CTS* device |
| aaa,cccttss,cccttss | |
| R,aaa,bbbbbbb,eeeeeee | Partial copy for an RBA** device |

---

ccc = cylinder; tt = track; ss = sector
*CTS = cylinder,track,sector
** RBA = relative block address

The uppercase characters, F and R are part of the message format. The R designates an RBA device, and the F designates fixed heads. The lowercase characters represent the following decimal digits, which you must provide:

- a = device address
- c = cylinder
- t = track
- s = sector
- b = beginning RBA (a decimal number from 1 to 7 digits in length)
- e = ending RBA (a decimal number from 1 to 7 digits in length)

The utility issues the following prompt after receiving the from-device address:

```
*** WAIT *** TAPE SAVE/RESTORE IN PROGRESS ***
```

The utility issues the following message after the save option completes execution.

```
SAVE COMPLETED
```

The utility then displays the utility option menu.

If during a SAVE operation the end of tape is encountered the following message is issued:

```
END OF TAPE ENCOUNTERED
LAST DISK SECTOR/RBA SAVED:  XXXXXXX
```

2. If the user is using both drives on the tape unit and the end of tape is encountered on the first drive, the following messages are displayed:

```
END OF TAPE ENCOUNTERED.
*** WAIT *** REWIND IN PROGRESS ON DRIVE 2 ***
*** WAIT *** TAPE SAVE/RESTORE IN PROGRESS ***
```

The utility switches to drive 2 and continues the SAVE. If while saving on drive 2, the end of tape is encountered, then the following prompt is issued:

```
END OF TAPE ENCOUNTERED
CHANGE CARTRIDGES ON BOTH DRIVES AND ENTER "GO".
```

Change the tapes on both drives and respond to the utility prompt by entering 'GO'. The utility will continue the SAVE and when the option completes execution it will display the following message:

```
SAVE COMPLETED.
```

3. If only one of the drives on the dual tape unit is used or if it is a single tape unit and the end of the tape is encountered during a SAVE operation, the following message is displayed:

```
END OF TAPE ENCOUNTERED
LAST DISK SECTOR/RBA SAVED:  XXXXXXX
```

The utility then issues the following prompt:

DO YOU WISH TO CONTINUE ON ANOTHER TAPE?

Respond to the utility prompt by entering a 'YES' if the save is to be continued on another tape. If a 'NO' is entered the save is ended, the utility will then display the option menu.

If a 'YES' is entered for the utility prompt, the following message is displayed:

*** WAIT *** WRITING END-OF-TAPE BLOCK ***

The utility writes a block of data at the end of the tape to indicate that the save is continued on another tape. It is this block that is checked during the restore operation to see if data was continued on another tape. If so the restore option will prompt for the next tape until all the data is restored.

Note: If saving on a used tape it is better to perform an erase before saving data.

Option 2 - Restore Tape to Disk

The restore option restores the contents of the streamer tape cartridge to the specified disk. You can execute a single restore from tape or multiple restores from tape. If you want to restore the contents of several disks that were saved to a single tape, you must restore all the disks at one time. This is because when you exit the restore option, the tape rewinds to the beginning-of-tape position. You must restore the information from a multiple save in the same order you saved the information. You cannot randomly restore information saved during a multiple save. If you want to rewind the tape during a multiple restore, you must change your option or perform an IPL.

1. Invoke the restore option by entering option 2 or 2* (see note on page 2-37) in response to the following utility prompt:

   SELECT OPTION:

   The utility issues the following prompt after selection of option 2:

   ENTER TO (DISK) DEVICE ADDRESS OR (CTS/RBA) FORMAT:

2. Enter the correct address of the device to which the information is to be restored. The disk device address must be in decimal format.

3. If the utility saved an odd number of sectors on the tape, the utility wrote an extra sector of zeros to the tape. When restoring a tape saved with this extra sector, enter the device address in CTS/RBA format* less than or equal to the number of sector/RBAs saved. This ensures that the sector after the last sector saved is not lost.

   After receiving the device address (or the appropriate CTS format), the utility issues the following message:

   *** WAIT *** TAPE SAVE/RESTORE IN PROGRESS ***

The utility issues the following message after the restore option completes execution:

LAST SECTOR (CTS) WRITTEN: XXXXXXX

or

LAST SECTOR (RBA) WRITTEN: XXXXXXX

4. If the restore is performed on a dual drive unit, both the drives on the unit are being used, and if it is a multi-tape restore (data was saved on more than one tape) then the utility will automatically switch to drive 2 when the end of tape is encountered on drive 1. If the SAVE was done to more than 2 tapes, the utility will issue the following prompt when the end of tape is encounterd on drive 2.

   CHANGE CARTRIDGE ON BOTH DRIVES AND ENTER "GO"

   Respond to the utility prompt by inserting the next set of tapes into the drive and entering 'GO'. The restore will continue until all the data is restored or until the end of tape is encountered on the second drive. If all the data on tape for that particular SAVE was restored to disk then the utility issues the following message:

   DATA ON TAPE COMPLETELY RESTORED

   The utility issues the following messages if a partial restore of the data from the tape to the specified disk was accomplished:

   LAST SECTOR (CTS) WRITTEN: XXXXXXX

   or

   LAST SECTOR (RBA) WRITTEN: XXXXXXX

   DATA ON TAPE ONLY PARTIALLY RESTORED

   The utility displays the utility option menu.

   If the utility saved an odd number of sectors to tape and executed a complete restore of the data, the utility issues the following message:

   DATA ON TAPE ONLY PARTIALLY RESTORED

   Ignore this message.

Option 3 - Erase Tape Contents

The erase option destroys the entire contents of the tape. If an erase is being executed on both drives of the dual tape unit then the utility, after erasing the tape on drive 1, automatically switches to drive 2 and performs an erase on that unit. You should make a backup copy of the tape(s) before executing the erase option.

1. Invoke the erase option by entering option number 3 in response to the following utility prompt:

```
SELECT OPTION:
```

The utility issues the following message after the selection of option 3:

```
              *** WARNING ***
ALL DATA ON TAPE WILL BE DESTROYED.  CONTINUE?
```

2. Enter YES to invoke the erase option. The following messages are issued if the erase option is performed on the dual drives:

```
*** WAIT *** REWIND IN PROGRESS ON DRIVE 1 ***
*** WAIT *** ERASE IN PROGRESS ON DRIVE 1 ***
```

When the erase is completed on Drive 1, the utility displays the following message and then switches to Drive 2 to continue the erase.

```
ERASE COMPLETED ON DRIVE 1
*** WAIT *** REWIND IN PROGRESS ON DRIVE 2 ***
*** WAIT *** ERASE IN PROGRESS ON DRIVE 2 ***
ERASE COMPLETED ON DRIVE 2
```

If a single drive unit is being used to perform the erase the following message is displayed.

```
*** WAIT *** TAPE ERASE IN PROGRESS ***
```

The utility displays the following message after the erase option completes execution:

```
ERASE COMPLETED
```

The utility returns to the main option menu.

Option 4 - Re-tension the Tape

The re-tension option winds the streaming tape in the cartridge so the tape is equally tensioned the entire length. If a re-tension option is being executed on both drives of the dual tape unit then the utility, after re-tensioning the tape on drive 1, automatically switches to drive 2 and performs a re-tension on that unit. Use the option on new tape(s) or tape(s) that have been stored for a long time.

1. Invoke the re-tension option by entering option number 4 in response to the following utility prompt:

```
SELECT OPTION:
```

2. The following messages are issued if the re-tension option is performed on the dual drives:

```
*** WAIT *** REWIND IN PROGRESS ON DRIVE 1 ***
*** WAIT *** RETENSION IN PROGRESS ON DRIVE 1 ***
```

When the re-tension option is completed on Drive 1, the utility displays the following message and then switches to Drive 2 to continue the re-tension.

```
RETENSION COMPLETED ON DRIVE 1
*** WAIT *** REWIND IN PROGRESS ON DRIVE 2 ***
*** WAIT *** RETENSION IN PROGRESS ON DRIVE 2 ***
RETENSION COMPLETED ON DRIVE 2
```

If a single drive unit is being used to perform the re-tension option, the following message is displayed.

```
*** WAIT *** TAPE RETENSION IN PROGRESS ***
```

After the option completes execution, the utility issues the following message:

```
RETENSION COMPLETED
```

The utility displays the utility option menu.

Option 5 - Verify Contents of Tape

The verify option verifies that data previously written to the tape can be read from the tape. Use the option to confirm the tape actually has data or that the data can be read without error. If a verify is being executed on both drives of the dual tape then the utility, after verifying the tape on drive 1, automatically switches to drive 2 and performs a verify on that unit. The option does not destroy data, and therefore, a backup of the tape(s) is unnecessary.

1. Invoke the verify option by entering option number 5 in response to the following utility prompt:

```
SELECT OPTION:
```

2. The following messages are issued if the verify option is performed on the dual drives:

```
*** WAIT *** REWIND IN PROGRESS ON DRIVE 1 ***
*** WAIT *** VERIFY IN PROGRESS ON DRIVE 1 ***
```

When the verify is completed on Drive 1, the utility displays the following message and then switches to Drive 2 to continue the verify.

```
VERIFY COMPLETED ON DRIVE 1
*** WAIT *** REWIND IN PROGRESS ON DRIVE 2 ***
*** WAIT *** VERIFY IN PROGRESS ON DRIVE 2 ***
VERIFY COMPLETED ON DRIVE 2
```

If a single drive unit is being used to perform the verify, the following message is displayed.

```
*** WAIT *** TAPE VERIFY IN PROGRESS ***
```

The utility issues the following message after the option completes execution:

```
VERIFY COMPLETED
```

The utility displays the utility option menu.

Option 6 - Certify Ability to Read From and Write to Tape

The certify option checks the ability to write data to the tape and to correctly read back the data on the tape. The option erases all existing data on the tape and writes a worst case data pattern on the tape. Use the option only on either a new tape or a tape on which problems were detected.

NOTE

This option destroys all data previously written to the tape.

1. Copy the contents of the tape(s) to disk before using option 6.

2. Invoke the certify option by entering option number 6 in response to the following utility prompt:

```
SELECT OPTION:
```

The utility issues the following message and prompt:

```
                *** WARNING ***
ALL DATA ON TAPE WILL BE DESTROYED.  CONTINUE?
```

If the user is using both the drives on a dual drive unit the utility will certify the tape on drive 1 and then switch automatically to drive 2 and certify the tape on drive 2. For a certify the following steps are involved. A worst case data pattern is written to the tape, then the tape is rewound and the data is read from the tape. After the data is correctly read, the tape is rewound and the written data is erased. The following messages are issued during a certify option.

```
*** WAIT *** REWIND IN PROGRESS ON DRIVE 1 ***
*** WAIT *** WRITE CERTIFY IN PROGRESS ON DRIVE 1 ***
RETRY COUNT:  XXXXXXX
WRITE CERTIFY ON DRIVE 1 COMPLETED
*** WAIT *** REWIND IN PROGRESS ON DRIVE 1 ***
*** WAIT *** READ VERIFY IN PROGRESS ON DRIVE 1 ***
*** WAIT *** REWIND IN PROGRESS ON DRIVE 1 ***
*** WAIT *** ERASE IN PROGRESS ON DRIVE 1 ***
*** WAIT *** REWIND IN PROGRESS ON DRIVE 2 ***
*** WAIT *** WRITE CERTIFY IN PROGRESS ON DRIVE 2 ***
RETRY COUNT:  XXXXXXX
WRITE CERTIFY ON DRIVE 2 COMPLETED
*** WAIT *** REWIND IN PROGRESS ON DRIVE 2 ***
*** WAIT *** READ VERIFY IN PROGRESS ON DRIVE 2 ***
*** WAIT *** REWIND IN PROGRESS ON DRIVE 2 ***
*** WAIT *** ERASE IN PROGRESS ON DRIVE 2 ***
CERTIFY COMPLETE
```

Before executing the Standalone Utilities (SAUs) from the Cambex cartridge tape, you must complete the following steps:

1. IPL the Cambex SAUs from diskette.

2. Call up the Cambex Disk/Diskette to Disk/Diskette (CK) utility.

   NOTE: Because diskettes do not have high enough data transfer rates, the programs must first be transferred to a disk and then transferred from a disk to tape.

3. Perform the following copy functions from the diskette to any disk using 1423 sectors of disk space (for example, a 63.2 MB SMD disk):

   a) Copy the Loader Program to Disk (253 Disk Sectors)

   ```
   From:  aaa,0650008,0730105     SAU 8" diskette
                          or
   From:  R,aaa,3867,4119         SAU 5.25" diskette
     To:  aaa,8000000,8000412     SMD work area (user's choice)
   ```

   b) Copy the SAU Programs to Disk (1170 Disk Sectors)

   ```
   From:  aaa,0020001,0400115     SAU 8" diskette
                          or
   From:  R,aaa,30,1199           SAU 5.25" diskette
     To:  aaa,8010000,8040429     SMD work area (user's choice)
   ```

4. IPL the Cambex SAUs from diskette.

5. Call up the Cambex Disk/Tape (TP) utility.

6. Select the save option.

7. Perform the following saves to tape:

   a) Save Loader Program on Tape as first save

   ```
   From:  aaa,8000000,8000412     SMD disk area (must be same as 3a)
     To:  aaa                     Cambex cartridge tape address
   ```

   b) Save SAU Programs on Tape as second save

   ```
   From:  aaa,8010000,8040429     SMD disk area (must be same as 3b)
     To:  aaa                     Cambex cartridge tape address
   ```

8. To execute the SAUs from the cartridge tape, you must set the cartridge tape attachment card so the tape executes either as the primary or alternate IPL device.

* See note on page 2-37 for special tape IPL considerations.

The Cambex Series/1 Standalone Utilities issue the error messages in table B-1.

TABLE B-1. STANDALONE UTILITIES ERROR MESSAGES

| Message | Description/Action |
|---|---|
| ALT MARKED BAD | The selected alternate sector was marked bad. Select another alternate sector. |
| ALTERNATE ASSIGNED FOR CYLINDER | A cylinder is defective; an alternate is assigned. No user action is required. |
| ATTACHMENT DETECTED INTERFACE PARITY ERROR | See hardware maintenance manual. |
| ATTACHMENT DETECTED PREMATURE END | See hardware maintenance manual. |
| ATTACHMENT EQUIPMENT CHECK | See hardware maintenance manual. |
| ATTACHMENT GLOBAL TIME OUT | See hardware maintenance manual. |
| ATTACHMENT LOCAL TIME OUT | See hardware maintenance manual. |
| BEGINNING RBA > ENDING RBA | The beginning RBA must be less than or equal to the ending RBA. |
| BLOCK LENGTH ERROR | See hardware maintenance manual. |
| BLOCK OUT OF RANGE | See hardware maintenance manual. |
| BUFFER CORRUPTED | See hardware maintenance manual. |
| BYTE COUNT GT RECSIZE | The specified byte count is greater than the record size. Specify a smaller byte count. |
| CANNOT ISSUE CYCLE STEAL STATUS | A failure has occurred on issuing the command for cycle-steal status. |
| CARTRIDGE NOT IN TAPE UNIT | The cartridge tape is not fully inserted in the tape unit. Reinsert the cartridge tape in the tape unit. |
| CONSOLE INTERRUPT | The console interrupt from the program panel occurred. Determine problem cause and rerun the program. |

| Message | Description/Action |
|---|---|
| CONTROL ADDRESS MARK ENCOUNTERED OR CROSS CAM BOUNDRY | A control address mark was encountered for a copy from diskette to disk. Cylinder 0 on the IBM-formatted diskette contains control address marks, which signify missing HRDI sectors and do not contain information. Use partial copies to copy other sectors on cylinder 0. |
| CONTROLLER FAULT | See hardware maintenance manual. |
| CORRECTED DATA | See hardware maintenance manual. |
| CRC ERROR | See hardware maintenance manual. |
| CSS WORD 1 IS: PROBABLY NOT READY YOU MAY TRY RELOADING THE PROGRAM | The cycle-steal information in word 1 could not be determined. The status word is written to the screen. This is a fatal error; there is no recovery. Reload the program and execute again. |
| CSSWO BOUNDRY ERROR CSS WORDS | An error has occurred in the initialization of cylinder 1. The cycle-steal status residual address in word 0 did not fall within the range specified. This is a fatal error; there is no recovery. Contact your designated hardware support group. |
| CTS FORMAT IS INCORRECT | Enter the correct sector as cccttss; where ccc = the cylinder, tt = the track, and ss = the sector number. |
| CTS FORMAT IS INCORRECT USE LARGE DISK ADDRESS CCCTTSS | The disk device being referenced requires the extended CTS format. Enter the information in the format cccttss; where ccc = cylinder, tt = track, and ss = sector number. |
| CTS OVERLAPPED | The source and target extents are overlapping. |
| CYLINDER OUT OF RANGE | The cylinder number is beyond the limit of the disk. Enter the correct cylinder number. |
| CYLINDER 0 DEFECTIVE DISCARD THE DISKETTE | If cylinder 0 is defective, the diskette is defective and you should discard it. Replace the defective diskette. |
| DEFECT MAP OVERFLOW | See hardware maintenance manual. |
| DEFECTIVE CYLINDER NOT RECOGNIZABLE | The disk device is unable to format cylinder; an alternate is assigned. No user action is required. |
| DEFECTIVE CYL # | A defective cylinder was encountered. No user action is required. |

| Message | Description/Action |
|---|---|
| DEFECTIVE DISKETTE CYLINDER | A READ or WRITE error has occurred on diskette. Check the diskette. You may require hardware help. Contact your designated hardware support group. |
| DEVICE CC IIB -or- DEVICE CC ISB -or- DEVICE CC DESCRIPTION -or- DEVICE CC ISB STATUS WORDS | An I/O error has occurred. Check to make sure the specified device is functioning properly. If the error persists and you cannot find the cause, record the error information. Contact your designated hardware support group. |
| DEVICE IS NOT A DISK | The device must be a disk device. Enter the address of the disk device. |
| DEVICE IS NOT A DISKETTE | The device must be a diskette device. Enter the address of the diskette device. |
| DEVICE IS NOT A TAPE | The device must be a tape device. Enter the address of the tape device. |
| DEVICE IS NOT READY | The disk device is not ready. Check to see if power is on. Power on the device. |
| DISK IO ERROR | An unrecoverable I/O error occurred. Action depends on the content of other displayed messages. |
| DISK IO - GET ALT SECTOR | A Read Sector-ID operation on cylinder 1 has failed. A positive response to the CONTINUE? question causes another attempt to read the sector ID. Enter YES to the CONTINUE? question. |
| DISK IO - READ ID | A Read Sector-ID operation has failed. A positive response to the CONTINUE? question results in another attempt to read the sector ID field. Enter YES to the CONTINUE? question. |
| DISK IO - READ IDS | A disk I/O error was encountered while reading sector IDs on cylinder 1. A positive response to the CONTINUE? question results in another attempt to perform disk I/O. Enter YES to the CONTINUE? question. |
| DISK IO - WRITE ID | A Write Sector-ID operation has failed. A positive response to the CONTINUE? question results in another attempt to write the sector-ID field. Enter YES to the CONTINUE? question. |
| DISK IO - WRITING IDS | A disk I/O error was encountered while writing sector IDs on cylinder 1. A positive response to the CONTINUE? question results in another attempt to perform disk I/O. Enter YES to the CONTINUE? question. |

| Message | Description/Action |
|---|---|
| DI - WRT/VERIFY | A disk I/O error was encountered while performing a WRITE/VERIFY operation on cylinder 1. A positive response to the CONTINUE? question results in another attempt to perform disk I/O. Enter YES to the CONTINUE? question. |
| DI READY | The disk device is not ready. Check the device. Power on the device. |
| DI .CALIBRATE FAILURE | The system could not perform a disk recalibrate during the alternate sector data recovery. A positive response to the CONTINUE? question results in data recovery for the alternate sector to be shipped. Enter YES to the CONTINUE? question. |
| DI<br>ST IO<br>IN RUPT | This is the format in which the diagnostic summary appears. |
| OP | |
| CS | |
| CS PREP | |
| DI MISCOMPARE | See hardware maintenance manual. |
| DI TTE IS NOT READY | The diskette device is not ready. Check the diskette unit. Power on the diskette unit. |
| DI TTE NOT INSTALLED OR U FORMATTED | Check to make sure there is a diskette installed in the IDISKETTE unit. If a diskette is installed it has not been initialized with a valid format. |
| DISSIMILAR FORMAT | See hardware maintenance manual. |
| DRIVE FAULT | See hardware maintenance manual. |
| DRIVE 1 AND DRIVE 2 NOT OPERATIONAL | Both drives on the dual tape unit cannot be accessed because of some hardware problem. Check if the drive is powered on. |
| DRIVE 1 NOT OPERATIONAL | Drive 1 of the dual drive unit cannot be used due to some hardware problem. |
| DRIVE NOT SELECTABLE | See hardware maintenance manual. |
| DRI SWITCH SETTINGS ARE IN ALID | The switches should be set as follows:<br>"0" for EMD1<br>"3" for EMD3 |
| DRIV 2 NOT OPERATIONAL | Drive 2 of the dual drive unit cannot be used due to some hardware problem. |

| Message | Description/Action |
|---|---|
| ECC ERROR | See hardware maintenance manual. |
| ECC ERROR READING SECTOR XXXXXXX | An ECC error was encountered during disk verification. Assign an alternate to sector XXXXXXX. |
| ECC INVERTED | See hardware maintenance manual. |
| END OF DISK | See hardware maintenance manual. |
| END OF FORMS | Install additional paper in the printer. |
| ERROR: NO DATA FOUND | The utility is unable to verify or do a restore because the cartridge tape has no data. Replace the cartridge tape with a cartridge tape that contains data to be restored. |
| ERROR: NO FILEMARK ON TAPE | The utility is unable to restore the cartridge tape because the tape is at the end and contains no filemark. Contact your designated hardware support group. |
| ERROR ON READING CSS | The utility cannot read cycle-steal status for the cartridge tape. Power on the tape unit. Contact your designated hardware support group. |
| ERROR PROCESSING END-OF-TAPE BLOCK | The utility is unable to read or write a block of data at the end of tape. Call Cambex software support. |
| ERROR SECTOR OUT OF LIMITS | During initialization of cylinder 1, an I/O error occurred, and the cycle-steal status in word 2 showed an invalid sector number. Assign a valid sector number to cylinder 1. |
| ERROR: TAPE IS WRITE PROTECTED | The utility cannot write to the cartridge tape because the tape is write protected. Replace cartridge tape with a cartridge tape that is not write protected. |
| ERROR TRYING TO FORMAT DISK | Retry the operation. If the same problem occurs, contact your designated hardware support group. |
| ERROR TRYING TO READ MODE SELECT PARAMETERS FROM DISK | Retry the operation. If the same problem occurs, contact your designated hardware support group. |
| ERROR TRYING TO READ SENSE DRIVE STATUS COMMAND | Verify that the switch settings on the back of the drive are correct and retry the operation. |
| ERROR TRYING TO WRITE MODE SELECT PARAMETERS TO DISK | Retry the operation. If the same problem occurs, contact your designated hardware support group. |

| Message | Description/Action |
|---|---|
| FAIL ON CERTIFY | The utility is unable to write certify the cartridge tape. Run the program again. If the problem persists, call Cambex software support. |
| FAIL ON ERASE | The utility cannot erase the cartridge tape. Call Cambex software support. |
| FAIL ON PREPARE | The device cannot be properly prepared for interrupts. Hardware help is necessary. Contact your designated hardware support group. |
| FAIL ON READING FIRMWARE ID | The utility failed while checking the firmware. Hardware help is necessary. Contact your designated hardware support. |
| FAIL ON RECALIBRATE | The device cannot be properly recalibrated. Hardware help is necessary. Contact your designated hardware support group. |
| FAIL ON RESET | The utility is unable to reset the cartridge tape. Call Cambex software support. |
| FAIL ON RETENSION | The utility is unable to re-tension the cartridge tape. Call Cambex software support. |
| FAIL ON REWIND | The utility is unable to rewind the cartridge tape. Call Cambex software support. |
| FAIL ON SELECTING DRIVE 1 | The utility was unable to use drive 1 on the dual drive due to some hardware error. |
| FAIL ON SELECTING DRIVE 2 | The utility was unable to use drive 2 on the dual drive due to some hardware error. |
| FAILS READING ALTERNATES | An I/O error occurred while reading alternate sector-IDs on cylinder 1. This is a fatal error; there is no recovery. Call Cambex software support. |
| FAILURE TO ENABLE ECC HARDWARE | The error correction hardware may have been disabled when assigning an alternate sector during data recovery. Contact your designated hardware support group. |
| FIXED HEAD OUT OF RANGE | The head number is beyond the limit of fixed head section of fixed head device. Enter the correct head number. |
| FROM SPACE MORE THAN TO SPACE | The target space is smaller than the source space. Increase target space. |
| HEAD SELECT ERROR | See hardware maintenance manual. |

| Message | Description/Action |
|---|---|
| INCONSISTENT LAST SECTOR STATUS | During initialization of cylinder 1, the last sector ID on that cylinder was inconsistent. The sector ID is marked bad. |
| INVALID ALTERNATE CYLINDER | Absolute extents have indicated the alternate cylinder. Copying the alternate cylinder is not allowed. Enter the correct cccttss. |
| INVALID COMMAND | See hardware maintenance manual. |
| INVALID CTS FORMAT | The format for cylinder, track, and sector is used. Enter the correct cccttss format. |
| INVALID DISK(ETTE) DEVICE PARAMETERS | The Idisk(ette) was initialized using a non-standard format. |
| INVALID DIRECTIVE ENTERED. THIS IS NOT AN RBA DEVICE | The directive must not be preceded by an "R", for a CTS device. |
| INVALID DIRECTIVE ENTERED FOR AN RBA DEVICE | The directive must be preceded with an "R", when entering beginning and ending extents for an RBA device. |
| INVALID FLAW ENTERED | Enter the flaws in the same format as the factory flaw map (CYL, HEAD, DISP). |
| INVALID FROM CTS/RBA > TO CTS/RBA | The number of bytes from the source drive is greater than the number of bytes of the target drive. Increase the number of bytes of the target drive. |
| INVALID HEX DATA | The data entered is not hexadecimal. You must enter the data in hexadecimal. |
| INVALID ID FIELD IN ALT CYL | An invalid sector-ID flag was found within the selected sector-ID field. A positive response to the CONTINUE? question results in selection of the next available alternate sector. Enter YES to the CONTINUE? question. |
| INVALID INPUT FORMAT | The format used is incorrect; check the usage procedure for the correct format. Enter input in the correct format. |
| INVALID NON-DECIMAL NUMBER | You entered an invalid nondecimal number. Enter a valid decimal number. |
| INVALID PARAMETER | See hardware maintenance manual. |
| INVALID RBA FORMAT | The RBA must be a decimal number from 1 to 7 digits in length. |
| IO INTERRUPT ERROR | An I/O operation was completed unsuccessfully. Action depends on the other messages displayed. Refer to the other messages. |

| Message | Description/Action |
|---|---|
| INSUFFICIENT CAPACITY | See hardware maintenance manual. |
| MACHINE CHECK | A machine check class interrupt has occurred. Contact your designated hardware support group. |
| MORE DATA | See hardware maintenance manual. |
| NO DATA ADDRESS | See hardware maintenance manual. |
| NO DATA EXISTS ON TAPE | The utility cannot verify the tape because the tape is blank. Insert the correct tape if the wrong tape is in the drive. |
| NO DEVICE ATTACHED | The device does not respond for the address that you entered. Enter the correct address. |
| NO INPUT | The carriage return (or ENTER) key was pressed before any input was entered. Enter any input before pressing the carriage return (or ENTER) key. |
| NO INTERRUPT ON RECALL | No interrupt has occurred during the recalibrate. Hardware help is necessary. Contact your designated hardware support group. |
| NO MORE ALTERNATE SECTORS | All available alternate sectors on cylinder 1 are assigned. There are no more alternates available for primary sector assignment. Use another disk. |
| NO RESERVED BLOCKS | See hardware maintenance manual. |
| NO SEEK COMPLETE | See hardware maintenance manual. |
| NO SLOT # 0 | There is no slot number 0 in the diskette magazine. Begin with slot number 1. |
| NON-ASCENDING BLOCK | See hardware maintenance manual. |
| NOT A DISK DEVICE | The device selected is not a disk device. Select a disk device. |
| NOT A DISKETTE/MAGAZINE | The device must be either a diskette or a magazine. Select either a diskette or magazine device. |
| NOT A FIXED HEAD DEVICE | A fixed head command is executed; this device does not have fixed heads. Execute the command to fixed head device or execute a different command. |
| NOT READY | See hardware maintenance manual. |

| Message | Description/Action |
|---|---|
| NRF ERROR READING SECTOR CCCTTSS | An NRF (no record found) error occurred while reading sector cccttss. This is an unrecoverable format error. Contact your designated hardware support group. |
| NUMBER OF DEFECTIVE SECTORS WOULD BE UNACCEPTABLE | No spare sectors are available for reassignment as alternates. The disk is unusable. Select another disk. |
| ONE OF THE PARMS EXCEEDS DEVICE CAPABILITIES | You entered an illegal cccttss. Either the cylinder, track, or sector is beyond the limit of the device. Enter legal cccttss information. |
| OPTIONS CONFLICT | See hardware maintenance manual. |
| OVERLAPPING EXTENTS | The source and target extents are overlapping. Enter source and target extents that do not overlap. |
| PAPER IS JAMMED | Correct the paper jam and enter GO. |
| PARAMETER OVERRUN | See hardware maintenance manual. |
| PARTITION OVERFLOW | See hardware maintenance manual. |
| POWER FAILURE | A power failure class interrupt has occurred. Restore power. |
| POWER/TERMINAL WARNING | A power failure/terminal warning class interrupt has occurred. Restore power. |
| PRINTER IN WAIT STATE | Put the printer in the ready state. |
| PRINTER POWER IS OFF | Turn on the printer and enter GO. |
| PROGRAM CHECK | A program check class interrupt has occurred. Inspect PSW and determine the cause of the interrupt. |
| PROGRAM DOES NOT ACCEPT THIS DEVICE<br>CSS WORD 1 IS: | The OPEN on the select disk device failed. The cycle-steal status, word 1, is provided for your inspection. Remedy the cause described by cycle-steal status word 1 information. |
| PROBABLY NOT READY<br>YOU MAY TRY RELOADING THE PROGRAM | Reload the program. |
| PROGRAM DOES NOT ACCEPT THIS DEVICE<br>IT IS NOT SUPPORTED | You selected an unsupported device. Select a supported device. |
| PROGRAM DOES NOT ACCEPT THIS DEVICE<br>NO FIXED HEADS | You made an attempt to initialize fixed head disk space on a device with no fixed heads. Initialize a device with fixed heads. |

| Message | Description/Action |
|---|---|
| PROGRAM LOGIC ERROR - EXCEEDED QUEUE CAPACITY | A software error has occurred. Call Cambex software support. |
| PROGRAM TERMINATION | The program was terminated due to a fatal I/O error. Determine the cause of the I/O error, fix the cause, and rerun the program. |
| RBA ENTERED EXCEEDS THE MAXIMUM DISK RBA | The RBA entered exceeds the maximum RBA for this device. See table 1-1 for the maximum RBA's. |
| RBA OUT OF RANGE | The RBA entered exceeds the maximum RBA for the device. |
| RBA'S OVERLAPPED | The source and target extents overlap. Enter extents that do not overlap. |
| READ DATA FAILED FOR SECTOR XXXXXXX | An attempt was made to assign an alternate sector, but the program was unable to recover the data. An alternate assignment can continue, but the recovered data is unreliable. Verify the data on sector XXXXXXX. |
| REASSIGNMENT FAILS | An alternate could not be assigned. Call Cambex software support. |
| RECORD NOT FOUND | See hardware maintenance manual. |
| REINITIALIZE THE DISKETTE | The diskette is damaged and must be initialized again. Reinitialize the diskette. |
| RESERVED BLOCK ERROR | See hardware maintenance manual. |
| RESERVED FIELD ERROR | See hardware maintenance manual. |
| RESTORE ERROR | See hardware maintenance manual. |
| SCSI PARITY ERROR | See hardware maintenance manual. |
| SECTOR OUT OF RANGE | The sector number is beyond the limit of the device (for example, sector 0 was specified for a diskette, or a sector beyond the last sector was specified). Specify a sector within the valid range. |
| SECTOR SIZE NOT SUPPORTED | The sector size entered is not supported; the program supports 128-byte sector, 256-byte sector, 512-byte sector, 1024-byte sector size. Check the diskette. The diskette may be a double-density diskette in a unit that does not support double density. Enter an acceptable sector size. |
| SEEK ERROR | See hardware maintenance manual. |

| Message | Description/Action |
|---|---|
| SEEK FAILS - BUILDING DCBS/IDS | During the build phase of the DCBs, a disk SEEK to cylinder 1 in order to write sector IDs has failed. A positive response to the CONTINUE? question results in another attempt to seek to cylinder 1. A disk recalibrate is performed before the next seek attempt. No user action is required. |
| SELECTED ALTERNATE IS DEFECTIVE<br>WILL ASSIGN ANOTHER ALTERNATE | An alternate sector is selected because reassignment was found to be defective. The bad alternate is marked defective and another alternate is selected. No user action is required. |
| SLOT # NOT SUPPORTED | This utility does not support the chosen slot number. Check the manual to find which slots are supported for the specified utility. |
| SOFT EXCEPTION | A soft exception class interrupt has occurred. Continue execution. |
| START IO ERROR | An I/O error has occurred. Action depends on other messages displayed. Refer to other messages. |
| START/STOP ERROR | See hardware maintenance manual. |
| TAPE UNIT IS NOT OPERATIONAL | The cartridge tape unit is not connected or not powered on. Connect and power on the tape unit. |
| TAPE UNIT IS NOT RESPONDING | The cartridge tape unit has a hardware problem. Contact your designated hardware support group. |
| THIS DISK HAS EXCEEDED THE ALLOWABLE NUMBER OF DEFECTIVE SECTORS | Contact your designated hardware support group. |
| TOO MANY DEFECTIVE CYLINDERS, DISCARD THE DISKETTE | The diskette has too many defective cylinders. Discard the diskette. |
| TRACK OUT OF RANGE | The track number is beyond the limit of the device (for example, track 0 was specified for a device that does not have track 0, or a track beyond the last track was specified). Enter a track number within the range. |
| UNABLE TO ASSIGN ALTERNATE SECTOR | Contact your designated hardware support group. |
| UNABLE TO CALIBRATE DISK TO PERFORM ERROR RECOVERY | The disk was not recalibratable. Hardware help is necessary. Contact your designated hardware support group. |

| Message | Description/Action |
|---|---|
| UNABLE TO CHECK TAPE STATUS | The utility is unable to check the status of the tape because it is not powered on or because the device address is incorrect or because of some hardware error. |
| UNABLE TO MARK ALTERNATE BAD | The system could not mark a defective alternate bad. A negative response to the CONTINUE? question aborts the current alternate assignment. |
| UNABLE TO MARK SECTOR DEFECTIVE | A flaw is detected in a spare sector, but the system cannot mark the sector bad. This is a serious error. Reinitialize the disk pack. If the problem persists, contact your designated hardware support group. |
| UNABLE TO READ A FILEMARK | There is a problem reading a filemark on tape. Call Cambex software support. |
| UNABLE TO READ ID | An I/O error occurred while reading an alternate sector ID on cylinder 1. Six attempts were made to read the sector ID in normal and skew head positions. The CTS of the defective sector ID is listed to your console. Contact your designated hardware support group. |
| UNABLE TO READ THE DEVICE PARAMETER TABLE | Unable to read the Media Parameter Block for the IDISK(ETTE). |
| UNABLE TO RECOVER DATA | An I/O error occurred at the attachment card level. The transfer of data from the attachment card to the Series/1 equipment was not permitted. This is a fatal error; there is no recovery. Contact your designated hardware support group. |
| UNABLE TO RECOVER DATA WITHOUT ERRORS<br>ASSIGN AND FILL ALTERNATE WITH 'FFFF'?<br>WILL WRITE DATA TO ALTERNATE "AS IS" | The system could not recover the primary sector's data without detecting errors. Fill the alternate sector's data field with 'FFFF' or use the data, with errors, as recovered from the primary sector. A positive response to the CONTINUE? question results in data being recovered "as is". |
| UNABLE TO SAVE FACTORY FLAW DATA ON DISK | The factory flaws entered during the initialization were not written on disk. If the device needs to be re-initialized the flaws will have to be re-entered. |
| UNABLE TO WRITE FILEMARK | The utility cannot write a filemark on the cartridge tape. Contact your designated hardware support group. |

| Message | Description/Action |
|---|---|
| UNABLE TO WRITE RECOVERED DATA | A write to the alternate cylinder with recovered data from the defective primary sector has failed. The primary sector data is not recovered. Contact your designated hardware support group. |
| UNABLE TO WRITE SECTOR-ID EXTENDED | A sector is defective but cannot be marked bad. Contact your designated hardware support group. |
| UNABLE TO WRITE SECTOR-ID FOR SECTOR REASSIGNMENT | An attempt to assign an alternate sector failed because the system cannot rewrite the original defect to point to the alternate. Contact your designated hardware support group. |
| UNDEFINED DEVICE | The device type is not supported. Enter a supported device type. |
| UNINITIALIZED DISKETTE | The diskette is not initialized. Initialize the diskette and try again. |
| UNINITIALIZED PARAMETER | See hardware maintenance manual. |
| UNIT ATTENTION | See hardware maintenance manual. |
| UNIT NOT UNLOCKED | See hardware maintenance manual. |
| UNMATCHED FORMAT DISKETTE | The diskette format, the number of sides, the sector size, or the density of the source and the target do not match. Enter valid information. |
| UNRECOVERABLE I/O STATISTICS<br>FROM DEVICE ADDRESS:<br>DSECT ADDRESS:<br>SEEK DCB'S:<br>R/W DCB'S:<br>CYCLE STEAL STATUS:<br>RESIDUE STATUS BLOCK: | An unrecoverable input/output error has occurred. Check the devices to make sure they are functioning properly. If you cannot find the error, record the error information and get hardware help. Contact your designated hardware support group. |
| UNRECOVERABLE PRINTER ERROR | Check the printer. If you cannot find the problem, get hardware help. Contact your designated hardware support group. |
| UNRECOVERABLE R/W ERROR | An unrecoverable read/write error has occurred. Hardware help is necessary. Contact your designated hardware support group. |
| UNSUPPORTED LUN | See hardware maintenance manual. |
| UNUSABLE DISKETTE | The diskette is damaged and is not repairable. Discard the diskette. |
| USE LARGE DISK ADDRESS CCCTTSS | An incorrect sector address was entered. Enter the correct sector address. |

| Message | Description/Action |
|---|---|
| **WARNING** XXXXXXX WAS NOT ASSIGNED AN ALTERNATE | The program was attempting to assign an alternate sector when an error condition caused the program to abort. Verify the disk format immediately. |
| WRITE PROTECT ERROR | See hardware maintenance manual. |
| WRITING IDS-STATUS ERROR | An I/O error occurred while writing the alternate sector ID. This is a fatal error; there is no recovery. Contact your designated hardware support group. |
| WRONG CYL OR FLAG | A sector-ID field contains an incorrect cylinder number or flag. A positive response to the CONTINUE? question results in the incorrect cylinder number or flag being listed to your console. This is followed by a disk recalibrate and another attempt at reading the sector-ID field. Enter YES to the CONTINUE? question. |
| CCCTTSS HAS AN INVALID ID | An attempt to assign an alternate to a defective sector failed. The system could not find the sector ID. Reload the program and try again. |
| CCCTTSS IS ALREADY IN USE | An attempt to make a spare sector defective has failed. That spare sector is currently serving as an alternate for some other sector. Try a different spare sector. |
| CCCTTSS IS ALREADY MARKED DEFECTIVE | An attempt to mark a spare sector as defective has failed. The spare sector has already been flagged as defective. Try a different spare sector. |
| YOU CANNOT REASSIGN ALTERNATE SECTORS | An attempt to assign an alternate sector on cylinder 1 has failed. That option is not available. Use a valid CTS for reassignment. |

Cambex

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LITHO IN U.S.A.